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EuroTelecom 1992

A Report on Telecommunications in the European Common Market

North American Telecommunications Association

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PREFACE

This Report is expansive, as the telecommunications markets of Europe, post 1992, will be expansive. The Report describes the potential business opportunities, predicting the size of telecommunications markets in the aftermath of European economic integration. You will easily be able to size markets and determine where your business may fit in the scheme of the separate twelve national markets and in the integrated market as a whole. The Report also provides insight into how things work, and are likely to work, following the 1992 deadline for integration.

But in a larger sense, this report suffers from an omission: the story of how U.S. telecommunications businesses will participate in this new, but old, economic reality called Europe. The omitted Chapter describing the extent to which the United States will participate in the new European order, has yet to be written by us or by anyone. It is for you to write in an American foreign trade policy which assures that the past is not prologue, that U.S. industry does not remain blocked from any substantial participation in the telecommunications business of Europe. It is this story, holding ominous signs for the future, that one may wish to consider in assessing economic opportunities in the future.

Things aren't bad for U.S. telecommunications exports in the European market. But they aren't good either. Europe understands discipline. It imports little, and it exports little. The relationship is one that has drawn small complaint, as nobody seems to have paid much attention. One would think a quiet understanding exists not to make waves in the telecommunications sector because there's enough trouble elsewhere. Europe and the United States have plenty of eggs to crack in the skillet of currency control stabilization, third world debt, and agricultural subsidies. And on those subjects they keep walking away from each other. So, why fool with a pittance like telecommunications? It only amounts to $1.57 billion in trade, and the U.S. gets a comfortable $801 million surplus out of it. With that there should be little squawk.

But the noise is rising. The European market is virtually closed to U.S. telecommunications products. It has been closed for years, and the situation is not likely to improve with the 1992 economic integration of the European Community.

What's most curious is the historic, statistical relationship in telecommunications trade between the United States and Europe. While the trade varies from country to country, and can grow from year to year at different rates among countries, the percent of U.S. exports to Europe's total telecommunications market rarely changes. The U.S. gets about 5% a year. In dollar volume the growth is steady because, even without evidence of manipulation, the U.S. is "allowed" to share in Europe's annual expenditures growth. Hence, the dollars grow as the percentages remain fairly constant. In 1989, the U.S. exported about $1.2 billion or 5.3% of the EC's $22.8 billion total telecommunications equipment market. In 1988, the U.S. exported $787.8 million, or about 4.0% of Europe's $19.9 billion telecommunications equipment market for that year.

Moreover, the Atlantic is a two-lane highway. European telecommunications exports to the United States rarely change either. They fluctuate around 1.6% to 1.8% of the U.S. annual telecommunications equipment market. The Europeans apparently don't chose to change this

trade equation either, even though they are now taking up commanding positions in U.S. telecommunications markets. Those in-roads, however, are not drawn from imports. Instead, Europeans dutifully move their plants here, invest or buy here, and employ people here. They keep the respective trading positions static, seemingly to protect the unassailability of their control of market shares in Europe.

Europe's telecommunications market operates in a totally managed environment, as most of it is owned by post and telecom authorities of the respective governments within the community. Tied to those authorities are manufacturing conglomerates holding privileged access, relatively imperturbable selling relationships, and the capacity to keep competing products out or limited. Privatization is a discussion and, except for the already privatized telephone system of the United Kingdom, the American model is being scrutinized. What will come of that scrutiny is unclear. But whatever it is, it's not likely to happen before 1992. Moreover, privatization is no guarantee of competition. As England and Japan are proof, privatization can be accomplished substantially without dislodging the pre-existing monopoly and its dominance. The new private monopoly simply takes over from the old public one.

History, therefore, provides little comfort that U.S. telecommunications trade will fare better in the Europe after integration than it did before. What should be painfully clear is that as the United States talks about world class players in a new, economically interdependent world, the only solid market in which to play at the least possible cost and with the lowest possible risk is the United States. It is the only fully open consumer market in the world where a free trade shibboleth keeps the industrial plants of Asia and Europe running around the clock at maximum capacity and full employment.

So, there is much the United States has to offer. As the premier market in the world, it is incumbent that we remain a premier trader in the world. A Europe exclusively for the Europeans is not only inconsistent with that need, but is inconsistent with Europe's long-run interests.

Edwin B. Spievack
President
North American Telecommunications Association
October 20, 1990

EuroTelecom 1992

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EXECUTIVE SUMMARY

EXECUTIVE SUMMARY

The path to EC unity is complex, tortuous, frustrating, bewildering, and often seemingly impossible. European countries traditionally have been fiercely nationalistic, with separate cultures, languages, and identities. They have fought bitter wars, and old feelings die hard.

Philosophically, Europeans understand that today's global economy leaves little room for a balkanized European marketplace. The problem is how to make 12 aggressively independent countries function as one economic unit.

In telecommunications the situation is about as difficult as it could be. The indigenous telecommunications service providers, usually called government PTTs (post, telephone, and telegraph) have traditionally guarded their fiefdoms, allowing no competition in services and, by coddling domestic suppliers, little competition in equipment. Their perceived mandate has typically transcended providing cost-effective telephone service, reaching into the realm of politics and social ideologies.

This has produced fragmented markets, incompatible networks, great inequalities in infrastructures, disparities in service pricing, and inefficient domestic equipment producers and service providers. In essence, the EC integration of European telecommunications is scattered with land mines.

That does not mean there is no hope. There are glimmers of positive achievements. Newly introduced pan-European digital cellular and paging appear to be on the brink of success. The EC seems to be fairly far along in the implementation of a pan-EC integrated services digital network (ISDN) as well. Where new technology can be adopted *en masse*, the Europeans seem to collaborate well. Many of the problems lie in patching together existing data and voice networks. Slowly but surely, even these problems will be resolved.

It is clear that due to the many technical, economic, legal, and political challenges, full integration of the European telecommunications will not occur until after 1992. Nonetheless, it will happen. There is every rational reason to integrate European telecommunications, and only illogical, emotional reasons not to do so.

When integration does happen, it will prove to be a bonanza for equipment manufacturers and service providers. The EC market for equipment will grow from to $33.2 billion by 1992 and $40.5 billion by 1995. This is an enormous rise from 1988 expenditures of $19.9 billion. The market for telecommunications services, ranging from traditional PTT voice services to sophisticated enhanced offerings such as voice mail, audiotex, credit card validation, and videotext will rise dramatically from $55 billion in 1988 to $70 billion by 1992 and $100 billion by 1995.

This explosive demand for equipment and services has been sparked by major events such as the reunification of Germany, a mass migration of foreign companies to European soil to access the

world's largest marketplace, and Spain's 1992 hosting of both the Olympics and the World Trade Fair. Moreover, European companies are preparing for the onslaught of foreigners and are sharpening their own competitiveness for a unified EC marketplace, sometimes with the help of outsiders. For example, GE Information Services manages a data network for Italian clothing retailer Benetton. The network links offices of 35 regional agents to 12 manufacturing plants in Italy, France, Spain, and Britain.

The fastest growing markets will be those with the most antiquated networks. Accordingly, Ireland, Portugal, Spain, and Greece will experience some of the most rapid growth through 1992 and beyond.

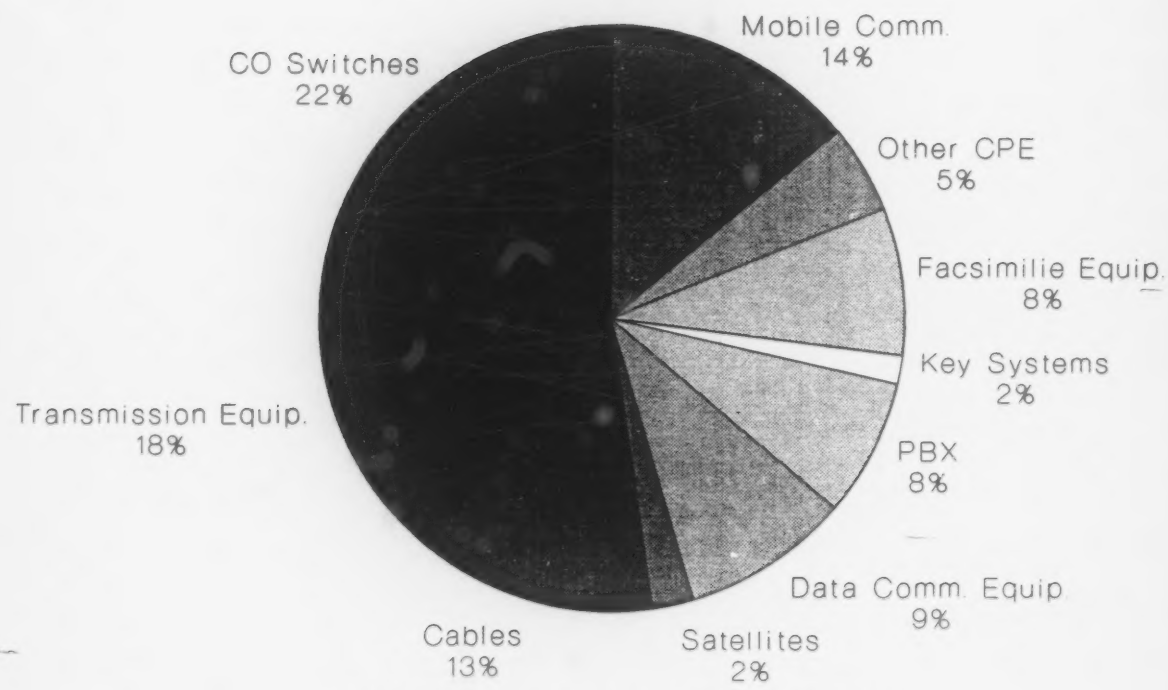
In terms of product areas, the largest markets will be for central office switches, at $6.8 billion by 1992, and transmission equipment at $5.6 billion. The transmission equipment market will experience the most rapid growth, rising to $8.0 billion by 1995. Other important equipment markets will include mobile communications at $4.4 billion by 1992, cables at $4.1 billion, data communications equipment at $2.9 billion, fax systems at $2.6, and PBXs at $2.4 billion.

The dominant players in the European marketplace will be those who work aggressively to support the market long term. Most likely, native suppliers such as Siemens, Alcatel, Ericsson, GEC, Philips, and Italtel will continue to dominate, but there will be plenty of room for others. The most promising prospects for non-European suppliers will be in the business market. Telecommunications users, including increasing numbers of U.S.-based multinationals accustomed

to the sophisticated telecommunications capabilities of the United States, are generally dissatisfied with PTT offerings and are actively seeking more sophisticated products and services at competitive prices.

FIGURE 1

Total Value of 1992 EC Market by Product



Total EC Market = $33.2 Billion

Whether or not there will be a simultaneous increase in external barriers at the same time there is a reduction in internal barriers is open to debate. The U.S. government has aggressively worked to ensure that the much prophesied "Fortress Europe" will not become a reality. Signals are mixed on how successful these efforts have been, but it is clear that much remains to be done to ensure that external protectionist measures do not increase at the same time internal barriers are dropped.

In discussions over the openness of the EC market to foreign firms, the Europeans have expressed concern over a number of U.S. initiatives they claim may inhibit EC exports to the U.S. market. Some of those include the movement on some fronts to modify the terms of the AT&T consent decree to allow the Regional Bell Operating Companies (RBOCs) to manufacture telecommunications equipment. The EC has also expressed concern over some of the provisions of the 1988 Omnibus Trade Act, which targets the U.S. telecommunications sector for priority treatment. While this is clearly a measure to strengthen their negotiating position, the EC claims it does not want to throw open the doors to the EC market if the doors to U.S. market are being closed.

Regardless of the conclusion of these discussions and irrespective of official policies, there will continue to be an ingrained bias towards buying a product made in Europe or, at a minimum, buying from a company with extensive investment in Europe, especially on the part of public agencies. This leads many experts to recommend that companies interested in exploiting the rich

opportunities that will develop to make as much of a commitment to Europe as possible. This might include direct foreign investment, a joint venture, or a licensing agreement.

A new order emerging in Europe. Despite monumental challenges, the EC understands that a common, sophisticated telecommunications infrastructure is essential to overall economic integration and growth. Integration will happen, if not by 1992, then perhaps by 1995. Whenever and however it occurs, it will to be a marketplace that cannot be ignored.

EC 1992

The marketplace for telecommunications equipment in the European Community (EC) is in a state of profound change. The blueprint for that change, the "Green Paper" issued by the Commission of the European Community (EC) in June 1987, envisions a very sophisticated, highly integrated, pan-EC telecommunications marketplace as a cornerstone of "EC 1992," the historic plan to integrate virtually all aspects of EC economic activity.

The Green Paper proposes, among other things, to eliminate barriers to intra-EC telecommunications services and telecommunications equipment sales. In addition, the Green Paper explicitly calls for the conversion of the telecommunications marketplace to one driven by competitive forces (see appendix B). Achieving these aims would be a reversal of traditional policies under which EC members developed their own telecommunications networks without regard to coordination across national borders. With EC 1992 that will change.

It is clear that, as the world becomes a smaller place in which to do business, international competitiveness will depend on the ability to penetrate global markets. Businesses will rely increasingly on sophisticated integrated telecommunications networks to track supplies from foreign sources, communicate with distant branch offices, court and service customers across the globe, and coordinate worldwide marketing.

To meet that challenge, the EC is adopting the goals of the Green Paper to place the EC telecommunications infrastructure at the forefront of technology and strengthen the global competitiveness of EC telecommunications suppliers. To achieve these goals though, many obstacles must be overcome, including ingrained nationalism, divergent cultures, language barriers, and bitter feelings from past military struggles. Add to the equation incompatible telecommunications networks, differing tariff structures, and strong-willed PTTs (post, telephone, and telegraph service providers) and the odds seem almost insurmountable.

When achieved, however, the results will be well worth the struggle. In 1992, the integrated EC telecom equipment marketplace is expected to reach $33.2 billion and become the second largest market in the world, accounting for more than 25 percent of worldwide sales. With rapid growth expected, by 1995 the size of this market will reach some $41.0 billion, and may surpass the U.S. market as the largest in the world. Presently, no single European country holds more than about 5 percent of the world market.

BACKGROUND

The genesis of the European Community (EC) was the 1951 establishment of the European Coal and Steel Community (ECSC). In 1957 the European Economic Community (EEC) was formed. In 1966, the ECSC and the EEC merged with the European Atomic Energy Community (EURATOM) to form the EC. The EC was formed to build foundations for economic and political cooperation and to make an eventual federation of Europe possible. The members of the

EC include Belgium, Denmark, France, unified Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain, and the United Kingdom.

Collectively the EC has a population of 325 million people, a gross national product of $4.7 trillion, and an average per capital GNP $14,500. The budget for the EC is $56 billion per year. The EC imported $459 billion of merchandise in 1988 and exported $430 billion the same year.

The headquarters of the EC is Brussels, Belgium. The main official bodies of the EC are the Council of Ministers, the EC Commission, the EC Parliament, and the Court of Justice. Among European institutions, there are several bodies that specifically affect the telecommunications industry. The European Conference of Postal and Telecommunications Administrations (CEPT) is an organization that represents the European PTT's. CEPT is open to all European countries, not just to those in the EC. The European Committee for Standardization (CEN) is the standards body for non-electrical products and the European Committee for Electrotechnical Standardization (CENELEC) is the standards body for electrical equipment. Working with both CEN and CENELEC is the principal overall coordinating telecommunications standards body in Europe, the European Telecommunications Standards Institute (ETSI). ETSI is supported by 94 manufacturers, 43 PTTs, 18 end user companies, 3 research bodies, and 2 private service providers from the 12 EC countries, the 6 members of the European Free Trade Association (EFTA), and Cyprus, Malta, and Turkey.

The EC maintains close relations with other groups in Europe. In particular, it has important economic agreements with the EFTA countries, which include Norway, Sweden, Austria, Iceland, Switzerland, and Finland. In addition, with the political changes in Eastern Europe, the EC is considering stronger ties to those countries.

EC TELECOMMUNICATIONS INFRASTRUCTURE

The EC telecommunications marketplace is unique in the world for its size and diversity. Today in the EC there are 325 million people in about 100 million households accessing 137 million telephone lines. There are over 160 billion telephone calls made per year, or on average 1.3 calls per person per day. Telephone penetration per 100 inhabitants varies significantly from 25.6 for Portugal to 90.5 for France.

TABLE 1
Selected EC Telecommunications Infrastructure Information For 1989

	Telephone Sets In Use (000)	Telephone Access Lines (000)	Total National Traffic (Mil. Calls)	Telephone Penetration Per 100 Inhab. (Number)
Belgium	4,999	3,755	NA	55.4
Denmark	4,604	2,894	4,751	89.5
France	38,999	27,995	24,330	79.5
Germany (W)	43,758	29,798	30,215	72.5
Greece	4,412	3,896	7,666	45.4
Ireland	1,196	905	3,115	42.5
Italy	31,250	21,511	22,575	55.4
Luxembourg	249	172	NA	NA
Netherlands	9,977	6,577	6,564	67.2
Portugal	2,386	2,060	NA	25.6
Spain	16,025	12,492	21,554	44.6
United Kingdom	35,020	24,950	39,555	65.1
Total EC	192,875	137,005	160,325	60.1

Source: NATA Market Research Department estimates based on various industry sources.

EC TELECOMMUNICATIONS EQUIPMENT MARKET

It is clear from the Green Paper that the EC has come to recognize the importance of an integrated telecommunications infrastructure and has placed special emphasis on its development. This will mean rapid growth in opportunities for suppliers, especially in those countries with older telecommunications networks that require major overhauling, such as Ireland, Portugal, and Greece. Dramatic growth will also be found in Germany as the antiquated system of what was East Germany is integrated with West Germany's system, one of the more advanced networks in the EC.

TABLE 2
The EC Market For Telecommunications Equipment, By Country, 1988-1995

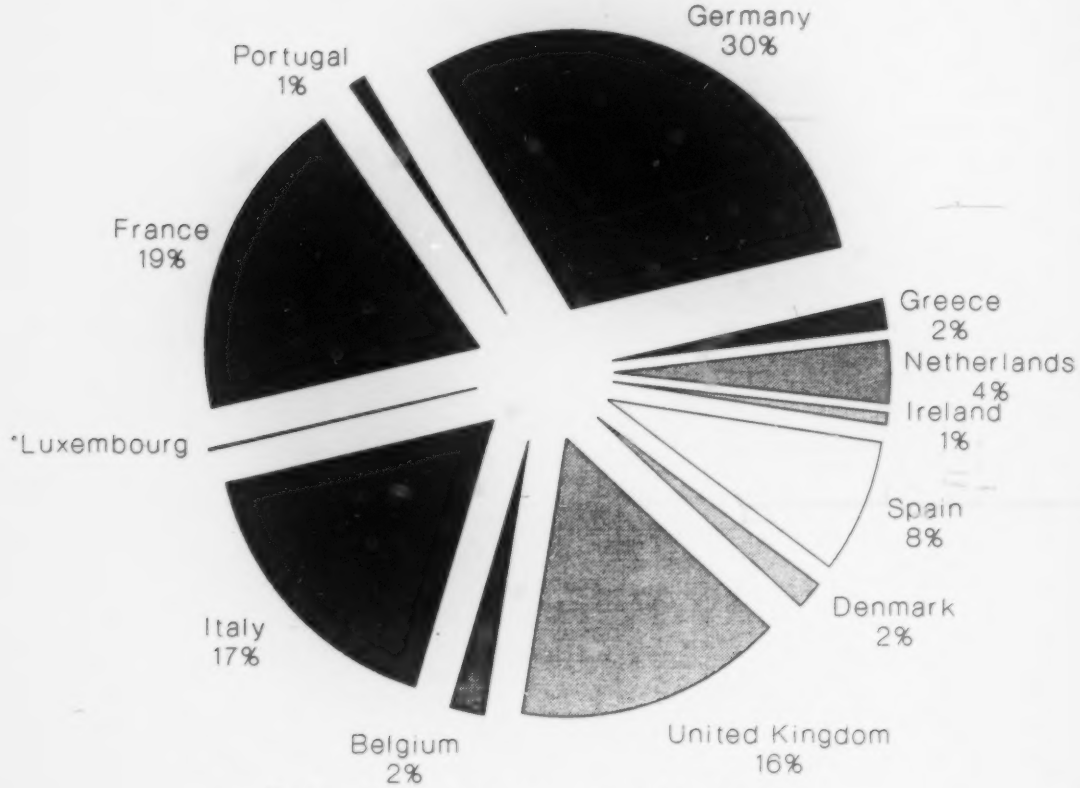
	1988	1990	1992	1995	CAGR*
	millions of dollars				percent
Germany	$5,314	$6,829	$9,982	$12,313	12.5
France	3,846	5,176	6,259	7,531	9.9
Italy	3,199	4,604	5,571	6,917	11.4
United Kingdom	3,625	4,358	5,207	6,572	8.7
Spain	1,676	2,195	2,589	2,886	8.0
Netherlands	845	965	1,202	1,416	7.5
Belgium	475	588	672	718	5.9
Greece	324	434	575	683	11.0
Denmark	320	478	540	648	10.4
Portugal	158	240	323	494	17.3
Ireland	113	168	227	283	13.7
Luxembourg	25	26	35	41	7.0
Total EC	$19,920	$26,061	$33,182	$40,502	10.4

* Compound Annual Growth Rate

Source: Estimated by the NATA Market Research Department based on various industry sources.

FIGURE 2

Total Value of 1992 EC Market by Member Nation



Total EC Market = $33.2 Billion

* Less than 0.5%

TABLE 3

The EC Telecommunications Equipment Marketplace, by Product, 1988-1995

EUROPEAN COMMUNITY	1988	1989	1990	1991
Central Office Switches: $ millions	$ 4,560.4	$ 4,604.4	$ 5,408.0	$ 6,328.1
Transmission Equipment: $ millions	3,848.0	3,842.3	4,375.1	5,202.1
Cables: $ millions	2,555.1	2,687.3	3,067.1	3,644.0
Satellites: $ millions	430.3	521.1	587.0	694.0
Data Communications Equipment: $ millions	1,430.0	1,691.6	1,940.2	2,056.8
PBX:				
Total value: $ millions	1,927.0	2,004.2	2,071.0	2,251.0
Total lines sold annually (000 lines)	3,230.0	3,345.0	3,724.2	4,053.1
Total installed lines (000 lines)	21,708.3	22,298.1	23,451.1	25,144.4
Key Systems:				
Total value: $ millions	396.0	407.0	412.0	480.1
Total lines sold annually (000 lines)	1,683.0	1.626.0	1,656.0	1,881.0
Total installed lines (000 lines)	10,714.2	11,011.3	11,217.2	12,566.6
Facsimile Equipment: $ millions	1,528.1	1,963.0	2,185.1	2,319.0
Other CPE: $ millions	550.0	765.4	1,037.2	1,313.1
Mobile Communications:				
Total value: $ millions	1,584.0	2,920.0	3,477.2	3,950.0
Cellular market: $ millions	1,066.0	2,045.0	2,738.0	3,168.0
Cellular subscribers (000)	527.3	1,162.0	1,503.4	1,885.1
Other Equipment	1,112.0	1,344.0	1,506.0	1,667.0
Total $:	$19,920.0	$22,750.3	$26,066.0	$29,905.2

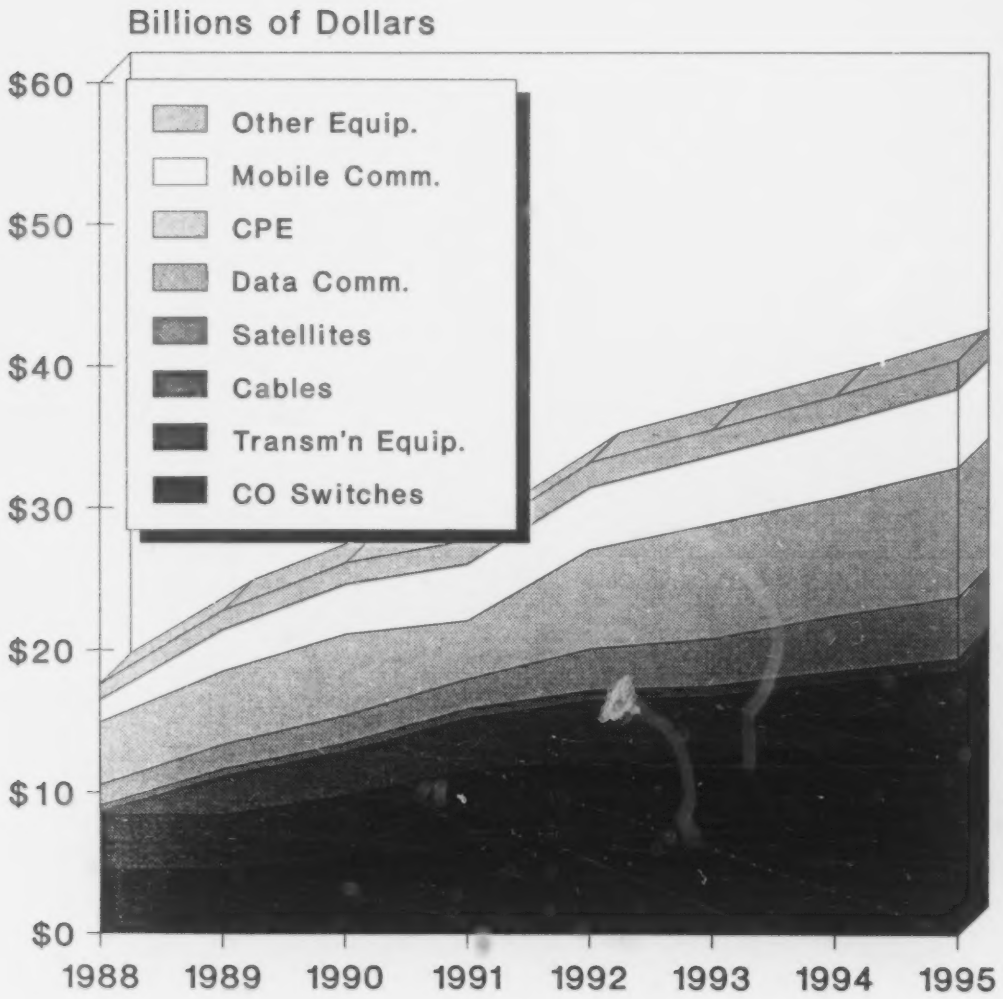
TABLE 3 (Continued)

The EC Telecommunications Equipment Marketplace, by Product, 1988-1995

EUROPEAN COMMUNITY	1992	1993	1994	1995
Central Office Switches: $ millions	$ 6,758.0	$ 6,952.0	$ 7,146.2	$ 7,402.0
Transmission Equipment: $ millions	5,566.0	5,526,0	6,192.1	6,685.0
Cables: $ millions	4,120.0	4,264.0	4,400.2	4,537.0
Satellites: $ millions	720.0	760.0	791.0	833.0
Data Communications Equipment: $ millions	2,905.0	3,317.1	3,914.1	4,300.0
PBX:				
Total value: $ millions	2,374.0	2,565.0	2,696.1	2,860.1
Total lines sold annually (000 lines)	4,311.3	4,647.3	4,880.0	5,179.4
Total installed lines (000 lines)	26,163.0	28,080.0	29,353.2	31,257.0
Key Systems:				
Total value: $ millions	489.4	526.2	550.1	578.0
Total lines sold annually (000 lines)	1,990.3	2,149.0	2,278.5	2,411.0
Total installed lines (000 lines)	13,555.3	14,636.7	15,522.0	16,582.0
Facsimile Equipment: $ millions	2,552.3	2,802.0	3,102.4	3,462.0
Other CPE: $ millions	1,526.0	2,145.3	1,968.0	2,227.2
Mobile Communications:				
Total value: $ millions	4,392.0	4,821.0	5,188.0	5,561.0
Cellular market: $ millions	3,466.0	3,896.0	4,137.0	4,617.0
Cellular subscribers (000)	2 089.0	2,374.0	2,696.0	3,000.4
Other Equipment	1,783.2	1,853.0	1,966.0	2,057.0
Total $:	$33,185.9	$35,532.0	$37,914.2	$40,502.3

FIGURE 3

European Community Market for Telecommunications Equipment, 1988 - 1995



The most impressive sales by 1992 will occur in central office switches, which will grow to $6.8 billion, and in transmission equipment, expected to rise to $5.6 billion. The market for transmission equipment will grow more rapidly, and will stand at $8.0 billion by 1995. The other major markets for 1992 will include mobile communications at $4.4 billion, cables at $4.1 billion, data communications equipment at $2.9 billion, fax systems at $2.6 billion, and PBXs at $2.4 billion.

EC TELECOMMUNICATIONS SERVICES MARKET

The growth in the EC market for telecommunications services will be enormous. Revenues from offerings ranging from traditional PTT voice services to sophisticated enhanced offerings such as voice mail, audiotex, credit card validation, and videotext will rise sharply from $55 billion in 1988 to $70 billion by 1992 and $100 billion by 1995.

This surge in demand for services is sparked principally by the integration itself. Traditionally, European markets were fragmented, and companies could get by with nonintegrated networks. However, unification is causing a business revolution! The EC is becoming one market. It is now critical that businesses are able to transmit huge amounts of data back and forth among offices, factories, warehouses, and suppliers across national borders.

Foreign multinationals, including many U.S.-based firms, are moving into Europe to take advantage of burgeoning opportunities. As they set up shop, they are demanding the type of

sophisticated services, such as voice mail, audiotext, and E-Mail, that they have grown accustomed to in the United States. They have discovered, for instance, that the use of E-Mail can save 7 percent of purchasing costs, and that with the use of voice mail telephone bills can be reduced by as much as 30 percent a month.

Moreover, in preparing for the onslaught of foreign competition, European companies are sharpening their own competitive skills to sell in a unified EC marketplace, sometimes with the help of foreign firms. For example, as mentioned, GE Information Services manages a data network for Italian clothing retailer, Benetton. The network links offices of 35 regional agents to 12 manufacturing plants in Italy, France, Spain, and Britain.

One area of radical departure from tradition is the growing support for the idea of a pan-EC, supranational long distance network. The proposal is being advanced by a consortium of Europe's national railway companies. The Hermes project, as it is called, would establish a pan-European fiber optic network offering basic voice and data services in competition with the PTTs. Racal Network Services and NYNEX head one group bidding to supply the project, Cable and Wireless and Compagnie Generale Des Eaux, the other.

However, because the PTTs are opposed to this idea, the Hermes consortium will probably have to take their case to the European Court of Justice to be successful. The parties are undoubtedly in for a long and tortuous ordeal, but one that could revolutionize intra-EC communications and bring substantial rewards to the successful team. A backbone fiber network throughout Europe

would provide users exactly the type of ubiquitous, sophisticated services they are clamoring for. For manufacturers, the concept is intoxicatingly attractive.

EC DATA COMMUNICATIONS MARKET

As multinationals from the United States and the Far East migrate to the EC to take advantage of the rich opportunities within the unified market, many will require the same extensive data communications capabilities that are employed elsewhere. However, the current data communications infrastructure in the EC is fragmented and inefficient. Where allowed, most value added networks are operated privately because of the unacceptable quality of the public data networks. A recent survey showed that more than 23 percent of attempted connections to the EC public network failed.

TABLE 4
Attempted Connections to the European Public Data Network

	Successful Attempts	Failed Attempts	Percent Failed
Belgium	39	6	13.3
Denmark	652	223	25.5
France	252	48	16.0
Germany, W.	30	2	6.5
Greece	NA	NA	NA
Ireland	NA	NA	NA
Italy	219	131	37.4
Luxembourg	NA	NA	NA
Netherlands	361	65	15.3
Portugal	33	60	60.6
Spain	566	320	36.1
United Kingdom	1,942	389	16.7
Total EC	4,094	1,244	23.3

Source: European Association of Information Services

EC member states have pursued different policies for different reasons when establishing public data networks. This has led to a patchwork of networks which are often incompatible. In addition, tariffs differ widely from country to country, making it difficult for large companies to rationalize their telecommunications requirements.

TABLE 5
Data Communications in the European Community
by Year-end 1990

	Data CPE Used On:		Private Leased Circuits	Telex Terminals	ISDN Lines
	Telephone Networks	Public Data Networks			
	thousands of units				
Belgium	10	7	104	30	20
Denmark	5	13	25	16	40
France	40	200	72	135	125
Germany, W.	167	211	6	167	150
Greece	1	15	10	25	*
Ireland	13	4	10	10	1
Italy	91	265	75	70	20
Luxembourg	1	1	15	3	0
Netherlands	5	10	20	42	80
Portugal	2	4	9	25	1
Spain	402	87	92	42	85
United Kingdom	175	120	275	120	100
EC Total	912	937	713	685	622

Source: NATA Market Research Department, based on various industry sources.

The data communications environment, however, is changing, as the EC begins to move aggressively toward ISDN. By year-end 1990, there should be close to 622,000 ISDN lines in place. All EC countries are expected to offer ISDN on a commercial basis by 1992, with the expectation that 80 percent of all subscribers will be able to reach an ISDN-capable exchange.

Among specific achievements to date, Belgium introduced ISDN in June 1989 in eight cities. Denmark introduced an ISDN pilot in 1989 and will offer ISDN commercially by 1992. Commercial implementation of ISDN in France and Germany is well underway. Greece has installed about 100 ISDN lines, but will not begin full testing until 1992. Commercial

introduction is slated for 1993. Ireland began ISDN field trials in 1990 and full commercial service is due by 1993. Italy has installed some 20,000 ISDN lines and will test interconnection with other ISDN networks in 1991. Commercial introduction is scheduled for 1993. Luxembourg has only begun to look into ISDN, but will probably follow EC directives and have it commercially available by 1993. The Netherlands has completed ISDN trials and will offer ISDN on a commercial basis by year-end 1991. Portugal, just beginning the testing phase, has scheduled commercial availability for 1992. Spain, which announced ISDN would be commercially available by year-end 1990, plans to have international ISDN connections to all major countries in 1991. The U.K. has already introduced ISDN on a commercial basis and plans to have international ISDN connections by 1992.

To meet these schedules, EC members have begun aggressively digitizing their networks to prepare for ubiquitous ISDN. France is the most advanced in this effor. For the combined EC countries, digitization is expected to reach 70 percent of transmission, 50 percent of long distance switching, and 30 percent of local switching by 1992.

TABLE 6
Anticipated Digitization in the EC Telecom Infrastructure
by Year-end 1990

	Degree of Digitization (in percent)		
	Transmission Systems	Switching	
		Local	Long Distance
Belgium	50	29	75
Denmark	85	23	40
France	70	70	75
Germany, W.	50	3	22
Greece	15	15	25
Ireland	70	65	85
Italy	45	25	36
Luxembourg	35	8	10
Netherlands	95	35	15
Portugal	70	20	30
Spain	47	5	45
United Kingdom	100	42	90

Source: European Conference of Postal and Telecommunications Administrations (CEPT) and EC Commission

In terms of the types of data communications equipment European businesses are buying, industry sources estimate that of the $1.9 billion spent in 1990, about 50 percent was spent on local area network equipment, about a 25 percent on modems, another 10 percent on packet switching equipment, and 10 percent on statistical and time division multiplexers. The balance was spent on equipment such as data PBXs and related products.

EUROPEAN TELECOMMUNICATIONS EQUIPMENT INDUSTRY

Equipment suppliers in the EC are restructuring to prepare for a unified marketplace. They recognize that consolidation is needed as markets once dominated by preferred national suppliers are thrown open to competition to all EC, and even non-EC suppliers. This has caused a joint

venture and merger mania in Europe, as companies such as ITT merge with Alcatel, GEC and Siemens jointly take over Plessey, and AT&T buys Istel and joint ventures with Philips (Philips sold its last shares in late 1990, but other European companies such as Spain's Telefonica have gained significant equity interest) and with Olivetti (later dissolved). Moreover, European producers are cooperating in a number of R&D related consortiums.

The European telecommunications equipment industry is concentrated in the hands of seven companies, accounting for 83 percent of the total European marketplace, and another 1,500-2,000 companies compete for the balance. Industry sources predict that, as mergers, joint ventures, and acquisitions continue, the trend towards concentration will become more pronounced, and the number of European suppliers will decrease by some 25 percent. This trend towards increased European concentration will be countered by a growing presence of non-European companies in Europe. Companies in the vanguard of this trend are Motorola, Northern Telecom, IBM, DEC, AT&T, NEC, and a number of others. Most of these have established manufacturing facilities in the EC to establish goodwill with EC member governments, as well as to signal their committment to Europe for the long run.

TABLE 7
Major European Telecommunications Equipment Suppliers

	Telecom Sales: 1987 --billion	1990(e) dollars--	Share of European* Market -Percent-	Sales to: Europe* ---% of	N.America total telecom	Asia sales---	Other
Alcatel (CGE/ITT)	$13.3	$16.4	31	70	10	13	7
Siemens**	6.3	8.4	20	75	13	8	4
Ericsson	4.5	7.3	10	55	15	15	15
Plessey**	2.4	4.3	9	76	12	5	7
Philips	2.2	4.2	4	50	5	30	15
GEC**	1.8	2.2	6	63	15	10	2
Italtel	1.1	2.0	3	80	2	5	13

* Includes both non-EC and EC countries
** GEC and Siemens have jointly taken control of Plessey

Source: Various industry sources.

EC REGULATORY ENVIRONMENT

One of the major difficulties to overcome before a truly unified market is possible is the harmonization of the complex and sometimes contradictory regulatory regimes in each EC country. For most EC countries, regulation of telecommunications has historically as much for political reasons as for technical and economic objectives. EC telecommunications regulators traditionally have not had the same goals as U.S. regulators, i.e., protection of consumers and industry from monopoly abuses and the achievement of universal service. In fact, in some EC countries there has been no separation between the regulator and the service provider. The driving force in many countries has been the protection and maintenance of national manufacturing and employment and the preservation of entrenched bureaucracies.

Figure 4
Europe's Regulatory/Competitive Landscape

	Basic Services	Mobile Services	Value-Added Services	Satellite Services	Regulatory/ Operation Separation
Belgium	Public Monopoly	Public Monopoly	Permitted On Leased Lines	Public Monopoly	Not Separate
Denmark	Govrnmnt Owned Co.	Govrnmnt Owned Co.	Competition Allowed	Public Monopoly	Separate
France	Public Monopoly	Limited Competitn	Competition Allowed	Monopoly	Separate
Germany	Public Monopoly	Limited Competitn	Competition Allowed	Competitn Allowed	Separate
Greece	Public Monopoly	Public Monopoly	Public Monopoly	Public Monopoly	Partially Separate
Ireland	Public Monopoly	Public Monopoly	Regulated Competition Allowed	Public Monopoly	Separate
Italy	Public Monopoly	Public Monopoly	Competition Allowed	Public Monopoly	Not Separate
Luxembrg	Public Monopoly	Public Monopoly	Competition Allowed	Public Monopoly Except TV & Radio	Not Separate
Nether-lands	Public Monopoly	Public Monopoly	Competition Allowed	Mixed Environmnt	Separate
Portugal	National Duopoly & Internat'l Monopoly	Public Monopoly	Regulated Competition	Public Monopoly	Separate
Spain	Public Monopoly	Public Monopoly	Competition Allowed	Monopoly	Separate
United Kingdom	Limited Competitn	Limited Competitn	Competition Allowed	Limited Competitn	Separate

Figure 4 (Continued)
Europe's Regulatory/Competitive Landscape

	Domestic Leased Circuits	Int'l Leased Circuits	Terminal Equipment	Status
Belgium	Certain shared use and resale permitted, network connection permitted.	Certain shared use and resale permitted, network connecton permitted.	Monopoly for cust.'s 1st phone, small PBXs, 1st telex & some modems. Competit'n for all else.	Legislation introduced to separate operation from regulation. Other legislation introduced to conform to EC directives.
Denmark	Within limits, shared use, resale & network connection allowed	Within limits, shared use, resale & network connection allowed	Competition permitted	Remaining restrictions on nat'l and int'l leased circuits to be removed, competition in mobile radio under consideration.
France	Limited shared use, resale & network connct'n permitted	No shared use or resale permitted. Limited network connection allowed	Competion permitted	Pending legislation to give more independence to France Telecom
Germany	Most shared use, resale & network connection permitted	Most shared use resale & networ connection permitted	Competition permitted	Further deregulation under consideration
Greece	Some shared use, no resale, very limited network connect'n allowed	No shared use, resale, or connection allowed	Monopoly for 1st phone & 1st pager, competition all else	Proposals introduced to conform to EC directives
Ireland	Most shared use, resale, & network connect's banned w/some execpt'ns	Most shard use, resale & netwrk connct'n banned w/some excpt'ns	Competition permitted	Legislation anticipated on more liberal value-added services
Italy	No shared use, resale, or netwrk connect'n allowed	No shared use, resle or netwrk connct'n allowd	Monopoly for 1st phone & telex, comp. for all else	Legislation pending to reshape Italian telecom and allow more liberal leased line market
Luxembrg	Most shared use, resale banned; limited network connct'n allowed	Most shared use, resale banned; limt'd connct'n allowd	Competition permitted	Change in status expected from gov't agency to gov't enterprise
Netherlands	Certain shared use, resale and network connect'n permitted	Certain shared use, resale and netwrk connct'n permitted	Competition permitted	Conformity with EC directives expected
Portugal	Most shared use, resale, network connect'n banned	Most shard use, resale, network connect'n bannd	Monopoly for 1st phone, competition all else	Legislation pending to liberalize most non-basic services
Spain	Limited shared use, resale, & network connect'n allowed	Most shard use, resale, network connection banned	Monopoly for 1st phone and 1st modem, competition all else	More autonomy for Telephonica from regulator expected; liberalizat'n of leased line also expected
United Kingdom	Shared use, resale, and netwrk connct'n permitted	No shared use, resale, & ntwrk connection permitted	Competition permitted	Current service duopoly to be examined 11/90

Source: Based on various industry sources

One aspect of traditional regulation of significant concern to corporate users is the wide disparity in telecommunications tariffs for services delivered between EC countries and services from the EC and from abroad. In some cases, calling between two particular EC countries can vary by 100 percent, depending on which way the call is going. Direct pressure from users, or through the selection of technologies that bypass PTTs, will cause reform in this area, albeit slowly and with resistance. To push forward this reform, the EC Commission itself is dedicated to making sure that tariffs in EC member states are cost-based.

TABLE 8

Cost of International Telephone Calls in the EC

	Intra-EC*		To U.S.**
	Average	Most Expensive	Average
Belgium	$2.62	$3.25	$2.10
Denmark	1.55	1.64	1.35
France	2.18	2.18	1.40
Germany, W.	1.97	1.97	1.55
Greece	3.22	4.11	2.35
Ireland	5.41	3.46	2.40
Italy	3.44	4.04	2.95
Luxembourg	1.66	2.74	1.80
Netherlands	2.07	2.74	1.40
Portugal	3.40	3.99	2.05
Spain	3.72	3.86	3.30
United Kingdom	2.29	2.86	.95

* Price in dollars for a three minute call in 1988 from originating country
** Average price per minute in dollars in 1989

Source: Various industry sources.

TABLE 9

Monthly Tariffed Rates for Leased Circuits* in the EC

	9.6 kbit/s	64 kbit/s	1.5/2.0 Mbit/s
	-------Thousands of U.S. Dollars Per Month------		
Belgium	$ 16.1	$172.0	$ 484.1
Denmark	11.3	60.0	163.1
France	38.5	144.2	339.0
Germany	97.4	287.9	2,973.7
Greece	31.5	NA	NA
Ireland	25.9	53.9	314.3
Italy	56.1	86.8	868.5
Luxembourg	8.3	20.3	101.5
Netherlands	20.3	78.7	381.8
Portugal	39.2	NA	NA
Spain	133.9	283.1	NA
U.K.	13.4	50.0	172.3

*Based on a network of 100 leased lines for varying distances

Source: OECD

IMPLICATIONS OF POLITICAL CHANGES IN EASTERN EUROPE

The years 1989 and 1990 witnessed a metamorphosis in eastern Europe. In virtually every country the traditional Communist government has been rejected and there has been a movement towards democratic and market-oriented reform. This will have profound implications on east-west relations within Europe. Once subject to extreme restrictions on trade of high technology products by most western nations, eastern Europe is becoming much less of a security threat. As a result, the multinational Coordinating Committee (COCOM) which establishes export controls to East Block countries, has significantly relaxed restrictions in recent months. This relaxation in trade policy will lead to new economic ties between the trading blocks.

Political ties will also be reformed, as demonstrated by the historic reunion of Germany. In virtually every respect the developments of East Europe bode extremely well for east-west relations. Furthermore, the EC has called for several initiatives to improve the relations between eastern and western Europe. Given the pace of change, it is not inconceivable that within a short time some of the most progressive East European countries might apply for EC membership.

Because telecommunications infrastructure is such an important part of economic development, East European countries are actively seeking western technology. As a result, many western companies are seriously evaluating opportunities in Eastern Europe.

There is certainly every reason to look covetously at the East European telecommunications market. With antiquated telecommunications networks, East European countries, including the Soviet Union, may spend up to $150 billion over the next decade to upgrade their networks. Taken together, these countries may eventually represent 20 percent of the world market for telecommunications equipment. Despite its initial attraction, the East European market is complicated by nonconvertible currencies, lack of funds, lingering trade restrictions, and the East European predisposition to barter. Telecommunications suppliers interested in that market might have to be forced to consider swapping telecommunications equipment for plywood, vodka, or even livestock.

In addition, the eastern European countries are hardly homogeneous in political, cultural, and economic characteristics, and their telecommunications infrastructures differ markedly. Czechoslovakia is considered to have the best telephone network in the Eastern Bloc, despite a relatively low penetration rate of 12.5 phones per 100 inhabitants. Hungary has a poorer phone system, but is further along in economic liberalization. Poland has an even less sophisticated telephone system, but is actively seeking economic ties with the West. Bulgaria has the highest penetration rate in the East Bloc, with about 18 phones for every 100 inhabitants, but has moved very slowly towards economic and political reform. The Soviet Union maintains the third largest telephone system in the world, with 27 million access lines, but has a very low penetration rate of 11.3 phones per 100 inhabitants.

Despite the pitfalls, companies should carefully evaluate the opportunities that do exist. A company with an aggressive, successful strategy in the EC stands a good chance of breaking into the East European markets as the economies of eastern and western Europe become more intertwined. This is especially true for telecommunications, where technical standards and certification policies can be strong impediments to trade. East European countries will undoubtedly be invited to join ETSI and other European standards bodies, thereby greatly enhancing technical compatibility in Europe as a whole.

BELGIUM

BACKGROUND

Belgium, one of the original members of the European Community, is a relatively small country situated between France, the Netherlands, Luxembourg, and Germany. Belgium, Luxembourg, and the Netherlands formed a customs union in 1947. Belgium has an area of 11,781 square miles. The population of Belgium is 9.9 million people and 3.7 million households. Estimated 1989 gross national product (GNP) amounted to $168 billion. The government is a constitutional monarchy with two legislative bodies. The head of the government is the Prime Minister. Belgium's capital is Brussels. Brussels is also the headquarters of the European Commission.

The controlling authority for telecommunications in Belgium is the Ministry of Posts and Telecommunications. There is currently no separation between regulation and the provision of services, both of which are carried out by the network operator, Regie des Telegraphes et des Telephones (RTT). RTT was established in 1930 as the monopoly provider of telecommunications services in Belgium.

TELECOMMUNICATIONS POLICY

As with most European countries, the Belgium government has traditionally maintained tight control over the development of the telecommunications marketplace. In 1985, the RTT relaxed its grip on the terminal equipment market. While competition is not permitted for the customer's

first telephone, telex terminals, small PBXs (up to 10 extensions) and modems operating at 2400 bauds or less, competition is allowed for all other terminal equipment.

In the procurement of network equipment, RTT's current policy is to try to buy Belgian first and then to seek sources within the EC if the equipment is not available domestically. This policy is likely to change however, as the EC moves to open its public procurement marketplace.

In a recent development, legislation pending in the legislature calls for the replacement of the RTT by a network operator, Belgacom, and a regulator, the Belgian Institute for Telecommunications. Belgacom would act as an autonomous company, while the institute would handle technical specifications and policy development. This legislation, likely to be enacted by year-end 1990, would further stimulate the telecommunications liberalization reforms already under way.

TELECOMMUNICATIONS INFRASTRUCTURE

Despite the increasing importance of Belgium as the home of the European Commission, and the increase in immigration of mulitinational corporations wanting to be close to the seat of EC power, Belgium's telecommunications infrastructure is notorious for its inefficiencies and its inability to adequately address user concerns. Companies that come to Brussels to set up shop, especially U.S.-based ones, are surprised to discover that they must wait six months or more for a telephone line.

The Belgian government has made attempts to improve the situation and users have been subjected to several false starts at telecommunications reform, but the environment is still very problematic for users. The quality of the network is mixed; tariffs are way out of line with costs and not coordinated; direction from RTT is mixed on leased lines; and the overall posture of the RTT seems to be based on political motivations and not on serving the telecommunications needs of the public.

The total number of telephones in use in Belgium has increased from 4.3 million in 1985 to 5.0 million in 1989. Business lines have increased from .6 million to .8 million during the same period. Residential lines have increased from 2.5 million to 3.0 million. Telephone penetration per 100 inhabitants has risen from 44.0 in 1985 to 57.4 in 1989.

RTT has earned $1.2 billion from offering telecommunications services of all types. By 1990 it is expected that RTT's total telecommunications revenue will amount to $2.3 billion, of which $1.8 billion will come from telephone service and the balance from advanced telecom services.

TELECOMMUNICATIONS MARKET

With Brussels the headquarters of the Commission of the European Community and with so many network improvements that need to be made, the prospects for the Belgian marketplace are good. In total, $2.7 billion have been allocated over a five-year period beginning in 1987 for the modernization of the network. Areas of concentration are digital switching and transmission,

mobile communications, and data communications capabilities. The total market for telecommunications equipment in Belgium is expected to rise from $475.2 million in 1988 to $672.4 million by 1992 and $717.9 million by 1995.

The market for central office switches in Belgium has increased from $135.9 million in 1988 to an estimated $145.6 million in 1990. It is expected that by 1995 that market will reach $165.4 million. Transmission equipment will follow a similar trend, growing from $110 million in 1988 to $122.3 million in 1990 and $140.4 million by 1995. The Belgian market for data communications equipment will more than double between 1988 and 1995, from $40.6 million to $92.3 million.

With increasing relaxation of the terminal equipment market, private networks are becoming increasingly prevalent. The PBX market will accelerate from $35.7 million in 1988 to $49.0 million by 1995. Pan-European cellular and paging and the need for constant communications with the seat of the EC Commission will cause an explosion in the Belgium mobile communications equipment market from $28.9 million 1988 to $109.1 million by 1995.

Overall, about 70 percent of Belgium's telecommunications needs are met by about 25 local manufacturers. The marketplace is still relatively protected and isolated. However, as the terminal equipment market becomes more open, giving greater access to the end customer, and with EC plans for increased access to public procurement, the Belgian marketplace is likely to undergo substantial change in the mid 1990s as the industry consolidates.

TABLE 10

The Belgian Telecommunications Infrastructure, 1985-1990

BELGIUM	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	4,346.4	4,556.0	4,719.3
Total access lines (000)	3,060.7	3,257.4	3,401.8
Residential lines (000)	*2,448.6	*2,605.9	*2,721.4
Business lines (000)	612.1	651.5	680.4
Total network access line capacity (000)	3,578.0	3,632.0	3,746.0
New applications for service (000)	232.3	338.9	267.7
Total demand for service (includes moves and changes)	329.8	443.3	376.7
Waiting list for new service (000)	7.2	19.1	11.2
Pay telephones in service (000)	*11.0	*11.5	*12.0
Total national traffic (in millions of calls)	N/A	N/A	N/A
Total local traffic (in millions of calls)	N/A	N/A	N/A
Total toll traffic (in millions of calls)	N/A	N/A	N/A
Total outgoing international traffic (in millions of calls)	97.1	106.9	121.6
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	9.3	7.1	*8.2
Number of private leased lines (000)	87.1	93.6	97.0
Number of data CPE attached to dedicated public data networks (000)	1.1	1.0	4.7
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 997,608.3	$ 1,344,218.2	$ 1,564,975.9
Income from other telecom services ($000)	247,268.4	332,290.0	395,925.0
Total income from telecom services ($000)	1,244,876.7	1,676,508.3	1,960,900.9
Total expenses for providing telecom services ($000)	1,207,640.2	1,571,564.2	1,805,809.7
Net income ($000)	37,236.5	104,944.1	155,091.2
Annual investment in the network ($000)	412,155.0	488,418.3	493,592.5
Annual investment for switching equipment ($000)	164,862.0	195,367.2	197,437.0
Ratios:			
Telephone access lines per 100 inhabitants	31.0	33.0	34.5
Telephone penetration per 100 inhabitants	44.0	46.1	47.8
Telecommunications investment as a share of gross domestic product	5.1	4.5	4.1
Telecommunications investment as a share of gross fixed-capital formation	29.6	24.4	24.0

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 10 (Continued)

The Belgian Telecommunications Infrastructure, 1985-1990

BELGIUM	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	4,925.0	4,999.4	5,154.5
Total access lines (000)	3,559.2	3,754.8	3,845.6
Residential lines (000)	*2,847.4	3,003.8	3,121.5
Business lines (000)	711.8	751.0	765.4
Total network access line capacity (000)	3,893.0	3,954.4	4,024.5
New applications for service (000)	299.2	302.4	309.9
Total demand for service (includes moves and changes)	412.9	414.5	427.4
Waiting list for new service (000)	14.7	15.2	16.5
Pay telephones in service (000)	12.6	12.9	13.5
Total national traffic (in millions of calls)	N/A	N/A	N/A
Total local traffic (in millions of calls)	N/A	N/A	N/A
Total toll traffic (in millions of calls)	N/A	N/A	N/A
Total outgoing international traffic (in millions of calls)	143.9	145.9	149.9
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	*8.4	9.2	9.6
Number of private leased lines (000)	101.4	102.4	103.5
Number of data CPE attached to the dedicated public data networks (000)	6.7	7.2	7.5
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 1,677,704.4	$ 1,754,322.2	$ 1,812,554.3
Income from other telecom services ($000)	420,833.8	453,254.5	462,774.4
Total income from telecom services ($000)	2,098,537.8	2,207,576.7	2,275,328.7
Total expenses for providing telecom services ($000)	1,918,123.8	1,995,433.2	2,040,333.1
Net income ($000)	180,414.0	212,143.5	234,995.6
Annual investment in the network ($000)	446,608.6	455,613.4	459,667.4
Annual investment for switching equipment ($000)	178,643.4	182,245.4	184,777.5
Ratios:			
Telephone access lines per 100 inhabitants	36.0	38.0	39.1
Telephone penetration per 100 inhabitants	50.0	55.4	57.4
Telecommunications investment as a share of gross domestic product	3.4	4.1	4.1
Telecommunications investment as a share of gross fixed-capital formation	19.5	20.2	20.5

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 11

The Belgian Telecommunications Equipment Marketplace, 1988-1995

BELGIUM	1988	1989	1990	1991
Central Office Switches: $ millions	$ 135.9	$ 139.8	$ 145.6	$ 155.8
Transmission Equipment: $ millions	110.0	115.6	122.3	125.8
Cables: $ millions	48.0	49.2	47.9	49.6
Satellites: $ millions	10.2	10.5	11.6	12.4
Data Communications Equipment: $ millions	40.6	55.2	60.8	67.5
PBX:				
Total value: $ millions	35.7	37.6	39.5	42.3
Total lines sold annually (000 lines)	59.5	62.7	65.8	71.5
Total installed lines (000 lines)	396.7	417.8	443.9	470.0
Key Systems:				
Total value: $ millions	7.4	7.4	7.5	7.6
Total lines sold annually (000 lines)	29.6	30.0	30.4	31.0
Total installed lines (000 lines)	197.3	200.0	202.7	206.7
Facsimile Equipment: $ millions	20.9	21.5	24.6	24.9
Other CPE: $ millions	22.5	23.7	23.9	24.8
Mobile Communications:				
Total value: $ millions	28.9	75.6	87.9	92.5
Cellular market: $ millions	20.6	69.5	80.1	85.6
Cellular subscribers (000)	8.1	31.0	40.0	42.8
Other Equipment	15.1	13.5	16.4	17.8
Total: $ millions	$ 475.2	$ 550.0	$ 588.0	$ 621.0

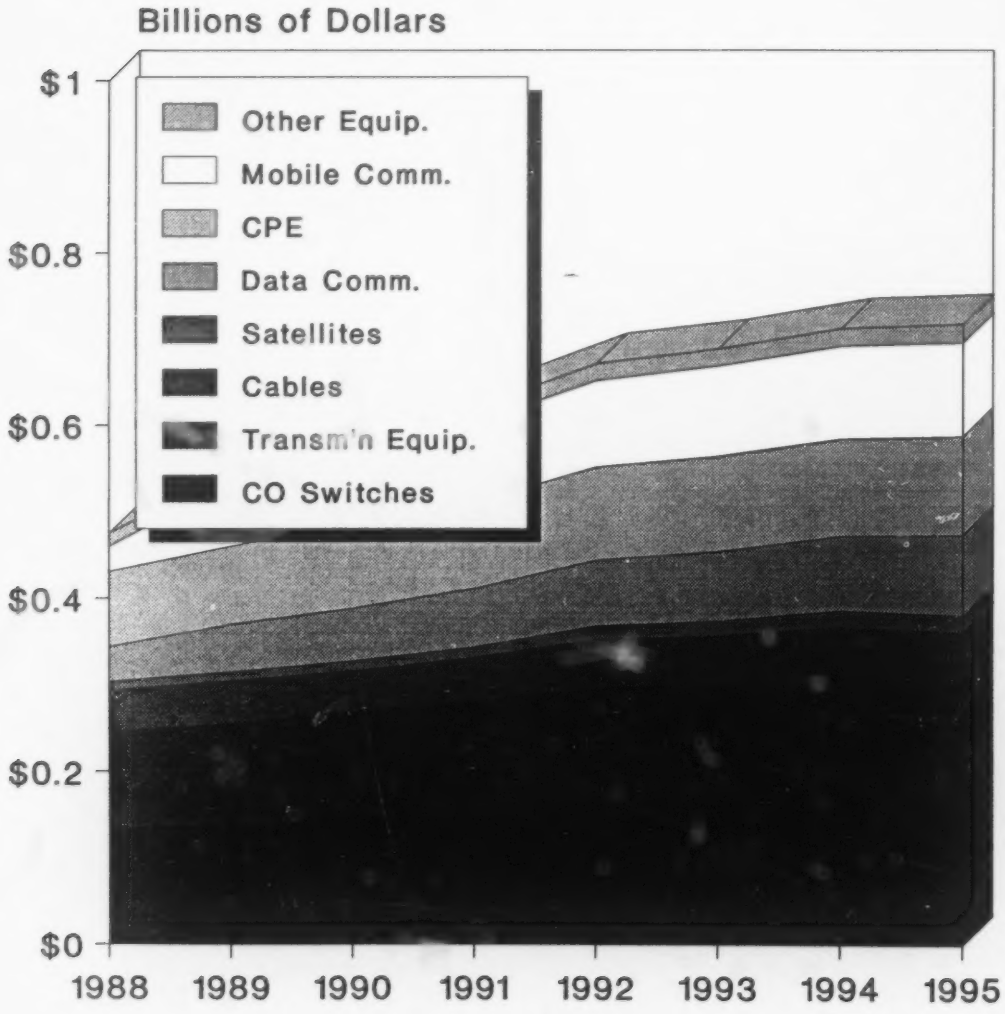
TABLE 11 (Continued)

The Belgian Telecommunications Equipment Marketplace, 1988-1995

BELGIUM	1992	1993	1994	1995
Central Office Switches: $ millions	$ 165.7	$ 170.4	$ 171.8	$ 165.4
Transmission Equipment: $ millions	130.9	130.5	135.9	140.4
Cables: $ millions	55.8	55.9	59.6	55.7
Satellites: $ millions	15.7	17.8	18.8	19.0
Data Communications Equipment: $ millions	75.9	79.8	85.9	92.3
PBX:				
Total value: $ millions	47.6	48.5	48.9	49.0
Total lines sold annually (000 lines)	80.7	81.5	82.2	82.4
Total installed lines (000 lines)	535.6	543.4	547.9	549.1
Key Systems:				
Total value: $ millions	8.0	8.1	8.1	8.0
Total lines sold annually (000 lines)	32.6	33.1	33.7	33.9
Total installed lines (000 lines)	217.7	220.4	225.4	226.0
Facsimile Equipment: $ millions	26.5	27.0	27.1	27.8
Other CPE: $ millions	25.9	26.7	28.7	29.9
Mobile Communications:				
Total value: $ millions	100.7	105.4	107.8	109.1
Cellular market: $ millions	90.7	97945	98.6	99.5
Cellular subscribers (000)	45.4	57.3	6.6	6.8
Other Equipment	19.7	19.2	20.5	21.3
Total: $ millions	$ 672.4	$ 689.3	$ 713.1	$ 718.0

Figure 5

Belgian Market for Telecommunications Equipment 1988 - 1995



DENMARK

BACKGROUND

Denmark is on a small peninsula attached to the northern edge of Germany and jutting into the North Sea. In addition to the mainland, Denmark includes over 100 populated islands. It occupies an area of 16,629 square miles. The population of Denmark is 5.1 million people and 2.2 million households. Estimated 1989 GNP amounted to about $115 billion. The government is a parliamentary state with a constitutional monarchy and one legislative body. The head of the government is the Prime Minister. Denmark's capital is Copenhagen.

The ministry responsible for the overall coordination of telecommunicatons in Denmark is the General Directorate of Posts and Telecommunications. The nation's telecommunications system is divided into four administrations: The Post and Telegraph Office (P&T), Copenhagen Telephone Company (KTAS), Jutland Telephone Company (JTAS), and Funen Telephone Company (FKT).

P&T has traditionally handled telephone services in South Jutland and on the island of Mon, as well as trunk telephone traffic and international traffic. P&T has also had responsibility for a number of nationwide telecommunications services, including data transmission, telex, teletex, mobile communications, and maritime services. However, in 1987, a number of telecommunications tasks, as well as responsibility for inland services, was transferred to the other telephone companies.

KTAS's franchise telephone area covers Sealand, Lolland-Falster, and Bornholm. It is a limited liability company in which the government owns a controlling interest. JTAS covers most of Jutland, together with the adjoining islands, and is also a limited liability company in which the government holds a controlling interest. FKT's concessionary area covers Funen and the adjoining islands. FKT is a cooperative owned mostly by the municipalities in the region with the national government owning the remainder. Within two years all five of the network operators are expected to merge.

TELECOMMUNICATIONS POLICY

Denmark maintains one of the more liberal telecommunications policies in the EC. Competition is permitted in value added services and in terminal equipment. In addition, public procurement is far more open than in many other European countries. Unlike other EC countries, Denmark's government and network operators include user participation in discussions of how the network will develop, through a formal body called the Telecommunications Council. In general, the Danish government seems very supportive of the EC directives in telecommunications and typically implements them well within the suggested timetables.

TELECOMMUNICATIONS INFRASTRUCTURE

Denmark has one of the most sophisticated networks in the EC. In addition, users generally give the Danish telecommunications operators high marks for service and reliability. Tariffs seem to

be more in line with costs than in many other EC countries. Disparities still exist in international tariffs, but much of the responsibility for that lies with lack of intra-EC coordination.

The number of telephones in use in Denmark increased from 4.0 million in 1985 to 4.6 million in 1989. Total national traffic has grown from 4.0 billion telephone calls in 1985 to 4.8 billion by 1989. Telephone penetration per 100 inhabitants is one of the highest in the EC at 90. The telephone companies earned a total of $1.1 billion in 1985. By 1990, telephone companies are expected to earn to $2.1 billion, with $1.4 billion from basic telephone service and the remainder from more advanced services.

TELECOMMUNICATIONS MARKET

With Denmark enjoying one of the most advanced networks in Europe and investing heavily in future growth, the prospects for domestic and foreign suppliers look good. In total, $4.2 billion will be spent through the end of the 1990s to implement a nationwide hybrid broadband network. The Danish authorities are also concentrating on mobile communications, telecommunications developments on the islands and other rural areas, and enhanced services such as electronic mail and videotext. The total market for telecommunications equipment in Denmark is expected to rise from $319.6 million in 1988 to $540.1 million by 1992 and $648.5 million by 1995.

The market for central office switches has grown from $95.4 million in 1988 to an estimated $125.9 million in 1990. It is expected that by 1995 that market will reach $161.3 million.

Likewise, transmission equipment will grow from $60.5 million 1988 to $75.4 million in 1990 and to $92.4 million by 1995. The market for data communications equipment will almost triple between 1988 and 1995 from $19.7 million to $49.6 million.

With private networks becoming increasingly prevalent throughout the EC, the PBX market will grow from $22.5 million in 1988 to $35.2 million by 1995. In the area of mobile communications, Denmark early on became part of the pan-Scandanavian cellular system, the Nordic Mobile Telephone System. Further developments in their cellular system, coupled with the Danish government's intention to integrate the islands more fully into the national economy will cause the Danish mobile communications equipment market to skyrocket from $37.5 million 1988 to $138.7 million by 1995.

TABLE 12

The Danish Telecommunications Infrastructure, 1985-1990

DENMARK	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	4,005.2	4,195.5	4,434.1
Total access lines (000)	2,543.4	2,683.3	2,711.2
Residential lines (000)	N/A	N/A	N/A
Business lines (000)	N/A	N/A	N/A
Total network access line capacity (000)	N/A	N/A	N/A
New applications for service (000)	N/A	N/A	N/A
Total demand for service (includes moves and changes)	N/A	N/A	N/A
Waiting list for new service (000)	N/A	N/A	N/A
Pay telephones in service (000)	*5.9	*5.9	6.2
Total national traffic (in millions of calls)	3,955.1	4,141.2	4,342.0
Total local traffic (in millions of calls)	2,445.2	2,547.2	2,629.1
Total toll traffic (in millions of calls)	1,510.3	1,594.4	1,713.2
Total outgoing international traffic (in millions of calls)	55.1	68.1	76.5
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to dedicated public data networks (000)	8.3	10.8	11.4
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 669,887.6	$ 884,109.6	$ 1,185,714.3
Income from other telecom services ($000)	392,921.3	465,395.1	709,841.3
Total income from telecom services ($000)	1,062,808.9	1,349,504.7	1,895.555.6
Total expenses for providing telecom services ($000)	*989,121.3	*1,243,411.6	*1,753,269.9
Net income ($000)	73,687.6	106,093.1	142,285.7
Annual investment in the network ($000)	273,146.0	420,980.9	491,746.0
Annual investment for switching equipment ($000)	109,258.4	168,392.4	196,698.4
Ratios:			
Telephone access lines per 100 inhabitants	50.0	52.4	53.0
Telephone penetration per 100 inhabitants	78.3	82.0	86.5
Telecommunications investment as a share of gross domestic product	5.0	6.1	6.0
Telecommunications investment as a share of gross fixed-capital formation	22.5	24.5	26.0

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 12 (Continued)

The Danish Telecommunications Infrastructure, 1985-1990

DENMARK	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	4,509.4	4,604.1	4,699.7
Total access lines (000)	2,792.3	2,894.2	3,001.4
Residential lines (000)	N/A	N/A	N/A
Business lines (000)	N/A	N/A	N/A
Total network access line capacity (000)	N/A	N/A	N/A
New applications for service (000)	N/A	N/A	N/A
Total demand for service (includes moves and changes)	N/A	N/A	N/A
Waiting list for new service (000)	N/A	N/A	N/A
Pay telephones in service (000)	6.2	6.3	6.3
Total national traffic (in millions of calls)	4,560.3	4,751.5	4,949.7
Total local traffic (in millions of calls)	2,738.2	2,839.7	2,955.4
Total toll traffic (in millions of calls)	1,822.5	1,911.8	1,994.3
Total outgoing international traffic (in millions of calls)	95.7	96.4	97.3
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to the dedicated public data networks (000)	12.2	12.9	13.2
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 1,253,333.3	$ 1,347,555.2	$ 1,405,666.2
Income from other telecom services ($000)	601,159.4	650,121.1	705,722.3
Total income from telecom services ($000)	1,854,492.1	1,997,676.3	2,111,388.5
Total expenses for providing telecom services ($000)	*1,689,057.6	1,835,969.7	1,905,672.3
Net income ($000)	*165,435.1	161,706.6	205,716.2
Annual investment in the network ($000)	510,870.0	525,010.0	532,225.4
Annual investment for switching equipment ($000)	210,576.4	215,325.6	219,777.6
Ratios:			
Telephone access lines per 100 inhabitants	55.0	57.0	58.9
Telephone penetration per 100 inhabitants	88.2	89.5	90.0
Telecommunications investment as a share of gross domestic product	6.6	6.7	6.9
Telecommunications investment as a share of gross fixed-capital formation	31.6	32.5	33.8

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 13

The Danish Telecommunications Equipment Marketplace, 1988-1995

DENMARK	1988	1989	1990	1991
Central Office Switches: $ millions	$ 95.4	$ 101.6	$ 125.9	$ 128.7
Transmission Equipment: $ millions	60.5	68.9	75.4	79.8
Cables: $ millions	20.5	23.6	25.9	29.6
Satellites: $ millions	10.5	11.6	12.2	12.3
Data Communications Equipment: $ millions	19.7	22.4	25.7	29.4
PBX:				
Total value: $ millions	22.5	27.5	30.4	31.1
Total lines sold annually (000 lines)	36.9	45.4	50.7	51.5
Total installed lines (000 lines)	313.5	315.0	320.4	343.3
Key Systems:				
Total value: $ millions	4.9	4.9	5.0	5.1
Total lines sold annually (000 lines)	19.6	19.7	20.4	21.2
Total installed lines (000 lines)	150.8	151.2	151.1	152.0
Facsimile Equipment: $ millions	15.5	17.4	25.4	29.6
Other CPE: $ millions	21.0	23.7	24.0	25.6
Mobile Communications:				
Total value: $ millions	37.5	100.3	109.7	117.6
Cellular market: $ millions	31.0	90.0	96.1	105.4
Cellular subscribers (000)	15.5	45.0	53.4	62.4
Other Equipment	11.6	15.4	17.9	22.5
Total: $ millions	$ 320.0	$ 417.3	$ 477.5	$ 511.3

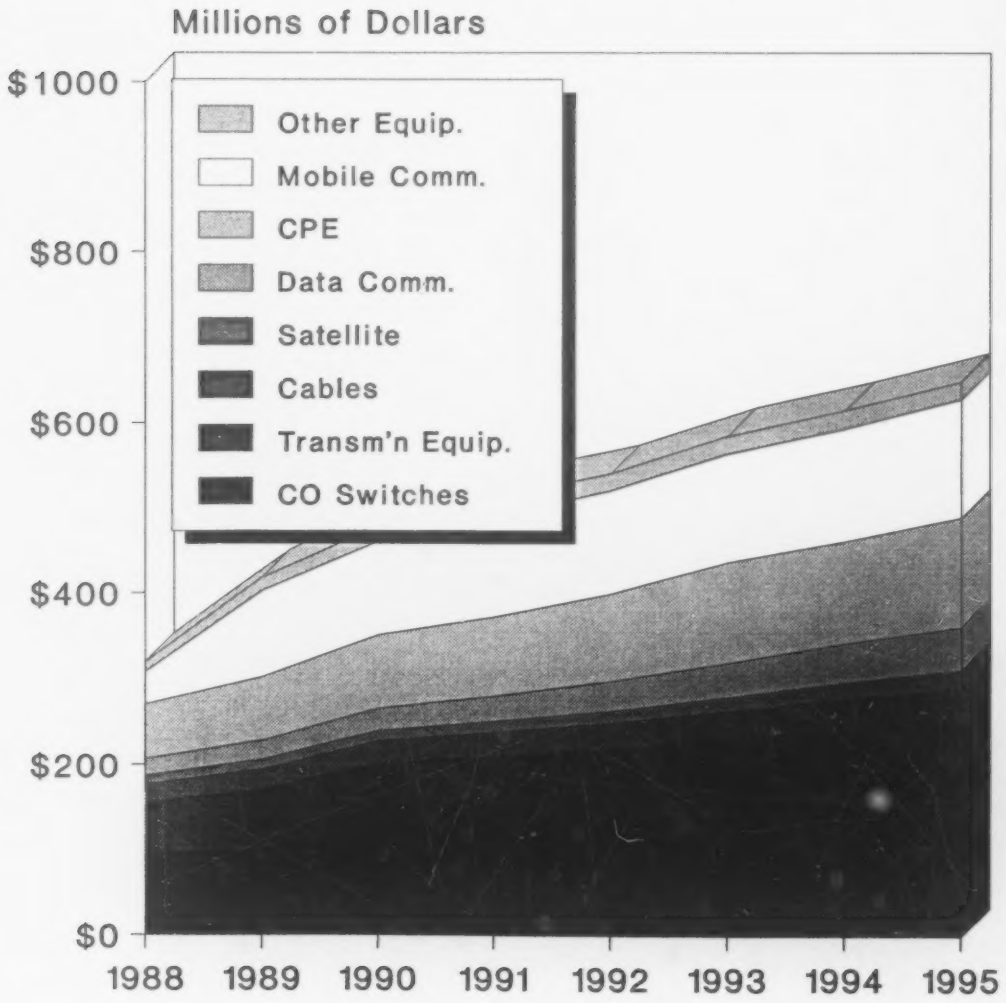
TABLE 13 (Continued)

The Danish Telecommunications Equipment Marketplace, 1988-1995

DENMARK	1992	1993	1994	1995
Central Office Switches: $ millions	$ 135.6	$ 141.8	$ 150.9	$ 161.3
Transmission Equipment: $ millions	83.6	90.2	91.6	92.4
Cables: $ millions	29.7	31.6	35.4	37.4
Satellites: $ millions	13.9	15.7	18.4	20.1
Data Communications Equipment: $ millions	34.5	39.7	45.7	49.3
PBX:				
Total value: $ millions	32.0	34.5	34.9	35.2
Total lines sold annually (000 lines)	53.0	57.4	58.4	58.7
Total installed lines (000 lines)	353.4	383.8	387.8	391.1
Key Systems:				
Total value: $ millions	5.0	5.1	5.1	5.2
Total lines sold annually (000 lines)	21.4	21.8	21.9	22.1
Total installed lines (000 lines)	153.5	154.0	155.1	157.2
Facsimile Equipment: $ millions	33.4	37.9	38.0	45.6
Other CPE: $ millions	31.0	39.6	40.7	42.6
Mobile Communications:				
Total value: $ millions	121.3	127.6	132.5	138.7
Cellular market: $ millions	110.4	115.5	121.3	129.7
Cellular subscribers (000)	64.7	77.3	78.4	86.5
Other Equipment	20.1	20.7	21.5	20.4
Total: $ millions	$ 540.1	$ 584.4	$ 615.0	$ 649.0

FIGURE 6

Danish Market for Telecommunications Equipment 1988 - 1995



FRANCE

BACKGROUND

France is one of the largest countries in Europe. It is situated between Belgium to the north, Spain to the south, and Italy, Switzerland, Germany, and Luxembourg to the east. France encompasses an area of more than 212,918 square miles. Close to 55.6 million people live in France in over 20.5 million households. The estimated 1989 GNP amounted to just over $1,000 billion. The capital of France is Paris. The government is a republic with two legislative bodies. The head of the government is the Prime Minister.

The French Ministry of Post, Telecommunications and Space (PT&E) is ultimately responsible for the management of telecommunications in France. Until October 1986, the telecommunications operator was known as the General Telecommunications Director (DGT), an integral part of the PT&E. In October 1986, DGT was separated from the regulatory aspects of the PT&E and became France Telecom. France Telecom, still a government agency, was separated as part of a movement towards a more commercially oriented telecommunications organization and the separation of operations from regulatory functions.

TELECOMMUNICATIONS POLICY

In recent years, France has undergone a number of changes, at least on paper, in its regulation of telecommunications equipment and services. In 1987, France issued a decree liberalizing the provision of value-added telecommunications services. While it appears that there has been

liberalization, certain licensing procedures have been established that slow penetration into the market by competitive firms. New legislation is pending that would bring French telecommunications more in line with EC directives, especially on services.

In another area, France has authorized competition in the paging and mobile radio services marketplace. In fact, BellSouth has an ownership stake in a French cellular radio telephone operation that competes with France Telecom.

France has liberalized its regulation for the provision and attachment of telecommunications terminal equipment. There are mixed signals, though, on how well the liberalization of the terminal market has been implemented in practice. According to some, foreign equipment suppliers still face formidable obstacles including conflicting information on regulations, an anti-foreign mindset of officials in the regulatory bodies, and the introduction of new policies part way through the approval process.

However, officials of the regulatory bodies insist that times are changing and that they want to make the French terminal equipment market more open and competitive. As a case in point, legislation is currently pending that would further remove France Telecom from government control by making it a public corporation. In addition, until 1989 only equipment manufacturers could apply for terminal equipment approval. Today, approval can be granted to distributors and/or agents. Officials also point to recent results. Of 1000 approvals granted during a recent time period, 40 percent were to non-French companies.

On the other hand, the French telecommunications standards-setting process remains basically closed. Outside firms are not provided with an opportunity to particpate in the process, and France does not accept U.S. or other foreign test data for certifying terminal equipment. Certification procedures are notoriously slow and, by some accounts, discriminatory against foreign-made products.

In another area, France Telecom's procurement of network equipment is governed by closed bidding procedures and France Telecom still maintains discriminatory procurement policies for the purchase of sophisticated network equipment.

TELECOMMUNICATIONS INFRASTRUCTURE

France maintains one of the most sophisticated telecommunications networks in the EC. Years ago the French government decided to pursue an aggressive, centralized strategy of network modernization. It now offers business and residential customers some of the most advanced services in the world. While this top-down method of network development has brought France to a leading position technologically, the trade-off for the customer has been choice. France Telecom has mandated the technologies and the timetable of implementation. Until recently, customers have had only limited success with private networks.

One of the principal success stories for France Telecom has been the proliferation of Teletel videotext services through Minitel terminals. There are currently more than five million Minitel

terminals in use accessing thousands of services. Total annual usage of Minitel terminals amounts to about 750 million calls and about 76 million hours. The most extensively used service is the electronic telephone directory, with an average of 25 million calls and 10 million hours per month.

In other areas, France has approximately 9,000 users of electonic mail, 290,000 fax terminals, 250,000 data links over leased lines, and 7,500 packet switching customers. Other technologies growing in usage include ISDN, mobile communications, and videoconferencing. France Telecom is strongly supporting the development of these services to enhance customer reliance on the public network.

In total, France has about 40 million telephones in service. Approximately 24 billion calls were placed over the public network in 1989. In terms of telephone penetration, France has achieved a rate of 90.5 phones per 100 inhabitants, the highest in the EC.

France Telecom earned an estimated $19.2 billion in revenue from all telecommunications services in 1989. Of that, about $13.8 billion was from telephone service and the balance from other, more advanced services.

TELECOMMUNICATIONS MARKET

The French telecommunications marketplace is the fifth largest in the world and is one of the most advanced marketplaces in the world. With digitization of the network well underway, only the most sophisticated equipment has a chance of being sold there. Add to that the fact that Alcatel, vying with AT&T for the position of number one telecommunications equipment manufacturer in the world, is headquartered in France, plus the country's tendency towards protectionism, and it becomes clear that only very serious and very advanced suppliers need attempt to sell there.

That said, France is a market that can hardly be ignored. It sits in the geographic center of the EC and is also the seat of the European Parliament (although the Secretariat of the European Parliament is in Luxembourg). Penetration of the French market will be a plum for the most aggressive manufacturers.

The total French market for telecommunications equipment is expected to almost double from $3.8 billion in 1988 to $7.5 billion by 1995. Purchases by France Telecom, principally network infrastructure, account for about half of the market. These purchases also represent the biggest opportunities, especially for domestic suppliers. The market for central office switching equipment is expected to rise from $951.5 million in 1988 to $1.3 billion by 1990 and $1.6 billion by 1995. Other areas of growth will be in transmission equipment, which will likely rise from $710.5 million in 1988 to $1.1 billion by 1995.

Meteoric growth is expected in mobile communications as the pan-EC digital cellular and paging markets develop. In France, the mobile communications market is expected to increase more than fourfold from $195.6 million in 1988 to $875.6 million by 1995.

The French market for data communications is also set for rapid expansion and is expected to grow from $475.6 million in 1988 to $1.1 billion by 1995. The best prospects for foreign-based companies will be in business communications equipment such as fax terminals, PBXs, key systems, voice messaging and other components of private networks. Companies such as Northern Telecom that invest in France will be virtually guaranteed acceptance and likely do well. (Northern Telecom began setting up a PBX manufacturing facility in Verdun, France in 1988.)

TABLE 14

The French Telecommunications Infrastructure, 1985-1990

FRANCE	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	34,346.0	*34,670.9	*35,965.8
Total access lines (000)	23,030.6	23,911.1	24,804.0
Residential lines (000)	*18,424.0	*18,554.1	*18,665.4
Business lines (000)	4,606.6	5,357.0	6,138.6
Total network access line capacity (000)	27,043.5	27,701.5	28,179.4
New applications for service (000)	2,516.5	*2,629.5	*2,848.5
Total demand for service (includes moves and changes)	3,303.1	3,506.0	3,798.0
Waiting list for new service (000)	37.7	28.0	25.0
Pay telephones in service (000)	*189.7	*194.3	206.3
Total national traffic (in millions of calls)	13,359.3	14,[illegible]50.8	16,483.0
Total local traffic (in millions of calls)	9,535.1	10,23[illegible]4	11,557.6
Total toll traffic (in millions of calls)	3,824.2	4,025.4	4,725.4
Total outgoing international traffic (in millions of calls)	N/A	N/A	N/A
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to dedicated public data networks (000)	33.1	42.0	52.3
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 9,908,947.4	$12,353,077.0	$15,655,094.3
Income from other telecom services ($000)	2,853,684.2	3,895,692.3	5,620,943.7
Total income from telecom services ($000)	12,762,631.6	16,248,769.3	21,276,038.0
Total expenses for providing telecom services ($000)	11,229,079.0	15,149,231.0	19,526,226.4
Net income ($000)	1,533,552.6	1,099,538.5	1,749,811.3
Annual investment in the network ($000)	N/A	N/A	N/A
Annual investment for switching equipment ($000)	N/A	N/A	N/A
Ratios:			
Telephone access lines per 100 inhabitants	40.8	42.2	43.6
Telephone penetration per 100 inhabitants	60.8	75.0	81.0
Telecommunications investment as a share of gross domestic product	7.6	7.9	7.9
Telecommunications investment as a share of gross fixed-capital formation	39.9	*37.5	*38.4

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 14 (Continued)

The French Telecommunications Infrastructure, 1985-1990

FRANCE	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	*36,723.4	38,999.4	39,775.6
Total access lines (000)	25,827.3	27,995.4	29,050.2
Residential lines (000)	*19,956.4	20,565.4	20,654.3
Business lines (000)	5,870.9	7,430.0	8,395.9
Total network access line capacity (000)	28,655.0	28,954.4	30,010.4
New applications for service (000)	*3,056.9	3,063.0	3,125.4
Total demand for service (includes moves and changes)	4,075.9	4,080.4	4,563.5
Waiting list for new service (000)	19.0	16.0	17.0
Pay telephones in service (000)	218.2	225.6	231.4
Total national traffic (in millions of calls)	22,269.6	24,329.9	26,679.7
Total local traffic (in millions of calls)	16,203.8	17,534.5	18,675.4
Total toll traffic (in millions of calls)	6,065.8	6,795.4	8,004.3
Total outgoing international traffic (in millions of calls)	N/A	N/A	N/A
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to the dedicated public data networks (000)	61.4	69.5	72.5
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$12,255,738.0	$13,755,629.0	$14,050,725.4
Income from other telecom services ($000)	3,947,213.0	5,437,222.5	6,010,222.3
Total income from telecom services ($000)	16,202,951.0	19,192,851.5	20,060,947.7
Total expenses for providing telecom services ($000)	15,910,492.0	17,510,666.4	17,004,356.4
Net income ($000)	292,459.0	$ 1,682,185.1	3,056,591.3
Annual investment in the network ($000)	N/A	N/A	N/A
Annual investment for switching equipment ($000)	N/A	N/A	N/A
Ratios:			
Telephone access lines per 100 inhabitants	45.2	46.4	47.5
Telephone penetration per 100 inhabitants	86.2	90.0	90.5
Telecommunications investment as a share of gross domestic product	8.2	8.3	8.3
Telecommunications investment as a share of gross fixed-capital formation	*40.0	*41.0	41.5

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 15

The French Telecommunications Equipment Marketplace, 1988-1995

FRANCE	1988	1989	1990	1991
Central Office Switches: $ millions	$ 951.5	$ 1,230.5	$ 1,304.4	$ 1,495.9
Transmission Equipment: $ millions	710.5	775.9	801.6	851.5
Cables: $ millions	403.9	415.7	475.4	550.7
Satellites: $ millions	139.5	175.6	192.5	203.7
Data Communications Equipment: $ millions	475.6	537.6	605.9	705.4
PBX:				
Total value: $ millions	320.5	322.4	325.9	385.9
Total lines sold annually (000 lines)	553.1	560.1	565.4	648.6
Total installed lines (000 lines)	3,687.3	3,734.0	3,769.3	4,053.8
Key Systems:				
Total value: $ millions	80.0	81.2	81.9	89.7
Total lines sold annually (000 lines)	320.2	324.8	327.6	358.8
Total installed lines (000 lines)	2,134.7	2,165.3	2,184.0	2,242.5
Facsimile Equipment: $ millions	312.4	495.6	544.3	579.1
Other CPE: $ millions	45.6	75.9	99.0	125.7
Mobile Communications:				
Total value: $ millions	195.6	425.6	495.5	565.7
Cellular market: $ millions	116.2	376.8	400.7	478.3
Cellular subscribers (000)	52.8	178.6	200.4	239.2
Other Equipment	210.5	225.3	249.4	254.3
Total $:	$ 3,846.0	$ 4,761.3	$ 5,176.0	$ 5,808.0

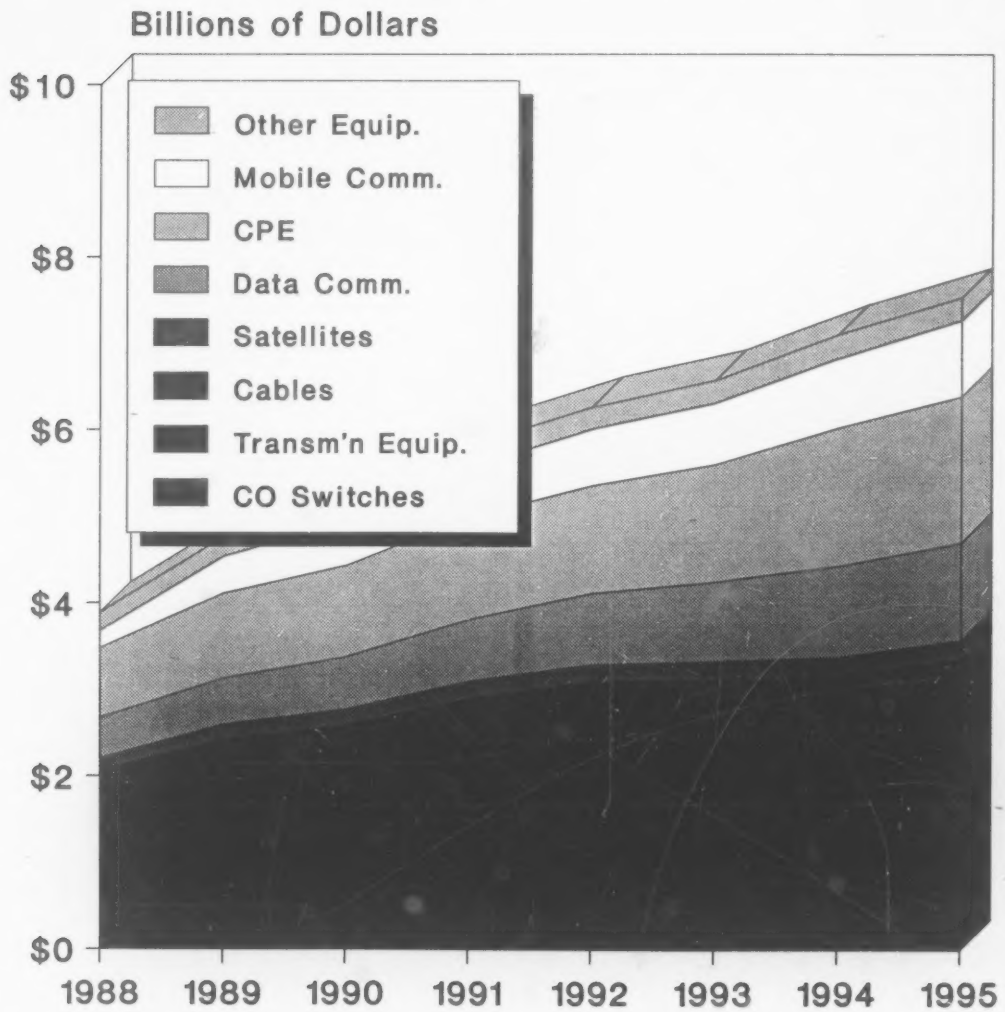
TABLE 15 (Continued)

The French Telecommunications Equipment Marketplace, 1988-1995

FRANCE	1992	1993	1994	1995
Central Office Switches: $ millions	$ 1,600.1	$ 1,596.3	$ 1,607.8	$ 1,625.5
Transmission Equipment: $ millions	895.6	920.1	950.9	1,099.0
Cables: $ millions	595.4	610.8	615.5	635.4
Satellites: $ millions	200.2	205.4	207.3	215.5
Data Communications Equipment: $ millions	816.7	912.3	1,050.3	1,122.4
PBX:				
Total value: $ millions	402.7	440.5	505.9	510.9
Total lines sold annually (000 lines)	676.8	740.3	835.7	858.6
Total installed lines (000 lines)	4,230.0	4,765.5	5,223.1	5,724.0
Key Systems:				
Total value: $ millions	95.6	104.3	115.7	129.9
Total lines sold annually (000 lines)	390.2	425.7	472.2	541.3
Total installed lines (000 lines)	2,438.8	2,660.6	2,951.3	3,608.7
Facsimile Equipment: $ millions	585.9	602.4	675.6	720.4
Other CPE: $ millions	160.5	205.7	295.6	325.5
Mobile Communications:				
Total value: $ millions	650.9	710.5	800.2	875.6
Cellular market: $ millions	517.8	601.1	704.2	735.9
Cellular subscribers (000)	258.9	316.4	370.6	408.8
Other Equipment	255.7	264.3	275.4	270.6
Total $:	$ 6,259.3	$ 6,572.6	$ 7,100.2	$ 7,531.0

FIGURE 7

French Market for Telecommunications Equipment 1988 - 1995



GERMANY

BACKGROUND

The discussion of Germany is predicated on the fact that from 1991 forward East and West Germany will be a united country integrated within the EC. However, because West Germany is for all practical purposes the core of the unified country, most of the discussion will concentrate on developments in West Germany.

West Germany is one of the largest countries in the EC, occupying close to 95,936 square miles. It is situated in the northern part of the EC, with France, Belgium, Luxembourg, and the Netherlands to the west, Switzerland and Austria to the south, Czechoslovakia and East Germany to the east, and Denmark to the north. The population of West Germany is about 60 million people, with approximately 26 million households. GNP for 1989 is estimated at $1.4 trillion. The government is a federal multi-party republic with two legislative bodies. The head of the government is the Chancellor. The capital of West Germany is Bonn. Once West Germany and East Germany are united, the capital of the unified country will be Berlin.

East Germany is about a third smaller than West Germany, occupying almost 42,000 square miles. It is bounded to the west by West Germany, to the south by Czechoslovakia, and to the east by Poland. Its population is approximately 17 million people and about 7 million households.

Traditionally, the West German post, telephone, and telegraph (PTT) authority has been one of the most dogmatic in the EC. However, with the imminent implementation of the EC integration,

and the general deregulatory trend around the world in telecommunications, on July 1, 1989, the West German Government began to implement a new law to restructure the PTT. This legislation is a major accomplishment that is likely to have a profound impact on increasing competition in the German telecommunications market, although it continues to leave broad discretionary powers to the Ministry of Posts and Telecommunications. To date, not all of the regulations implementing the new law have been enacted.

TELECOMMUNICATIONS POLICY

The restructuring of the PTT has created a new company called the Deutsche Bundespost TELEKOM (DB TELEKOM). DB TELEKOM will retain its monopoly of all voice telephone services, which accounts for about 90 percent of the public telecommunications services market. DB TELEKOM will also retain its monopoly of operating facilities, with some minor exceptions, such as specialized satellite services. Competition will be allowed in all non-voice telecommunications services such as data communications, value-added services, cellular radiotelephone, and two-way satellite communications. Because of DB TELEKOM's monopoly hold on facilities, competitors will operate on a resale basis. Certain services, such as data communications, will be subject to universal service requirements, with DB TELEKOM the carrier of last resort.

The new law also provides for the opening of the terminal equipment marketplace to competition. The last vestige of DB TELEKOM's monopoly in this area disappeared in July 1990, when the market for the customer's first telephone became open to competition.

Progress towards a more open environment was made even before the restructuring law when, as the result of 1985 discussions with the U.S., the German government eliminated a domestic information processing requirement, removed restrictions on the use of leased lines for value-added services, clarified and simplified the type approval process, and removed restrictions on the number of lines to be served by PBXs.

In addition, the West German government has opened all public procurement, subject to the liberalization requirements of the EC Commission, to bids from all international suppliers, not just EC companies. Since 1987 the Bundespost has opened 20 percent of the value of its telecommunications equipment procurement to international bidding. In 1988, the Bundespost also began a three-year plan to adjust tariffs to reflect costs, resulting in significant reductions in charges for long-distance telephone service and data communicaitons facilities.

Despite these landmark events and certain success stories by IBM (U.S), Northern Telecom (Canada), Matra (France), Nokia (Finland) and a few others, there remains some skeptism about how quickly foreign firms will be able to sell in the German market. Problems with standards, testing, and approval for terminal equipment have yet to be fully resolved.

TELECOMMUNICATIONS INFRASTRUCTURE

The West German telecommunications infrastructure is one of the more advanced on the continent. The German government has been aggressive in establishing the country's infrastructure to benefit all West German businesses and residential consumers. On average, 75 of every 100 West German inhabitants has a telephone. Major projects for DB TELEKOM focus on packet switching, ISDN, and mobile communications.

The number of telephones in use in West Germany increased from 37.9 million in 1985 to 43.8 million in 1989. Residential access lines increased from an estimated 17.9 million to 21.7 million during the same period. The total number of calls placed over the network rose from 27.2 billion in 1985 to 30.2 billion in 1989. The number of data communciations terminal equipment attached to the public telephone network almost doubled from 86,500 in 1985 to 161,500 in 1989. Likewise, the number of data terminals attached to public data networks jumped from 129,100 to 205,400 during the same period.

The West German PTT (now DB TELEKOM) earned $13.5 billion from telecommunications services in 1985, of which over $12 billion was from basic telephone service. By 1989, revenue had jumped to $22.4 billion, of which $19.7 billion was from basic telephone and the balance was from advanced services.

In East Germany the situation is completely different. The East German telecommunications infrastructure is archaic in comparison to West Germany. Nearly a quarter of East Germany's public exchanges were installed more than 60 years ago. Many of the remaining exchanges are more than 25 years old. East Berlin, the most advanced East German city, has a telephone penetration of 43 per 100 inhabitants. In East Germany as a whole the figure is around 11. East Germany has only 1.8 million telephone lines installed and a backlog of 1.2 million applications for service.

By year-end 1989 there were only 1300 lines from West Germany to East Germany, and only 215 in the other direction. Data communications is virtually nonexistent in East Germany, with no more than 5,000 dedicated lines in place and a backlog of 13,000 applications.

Since the destruction of the Berlin Wall, events developed rapidly. In the first half of this year, 2,000 lines were installed between East and West Germany, and a fiber optic cable was installed between East and West Berlin, which will provide an additional 30,000 channels. Telephone traffic between the two parts of Germany should approach four million calls per month by year-end 1990.

The two network operators have agreed to a restructuring plan dubbed "Telekom 2000," proposing a broad range of goals by the end of the century. Included in the plan is the construction of a digital overlay network to replace the aging East German system. In the first stage, to be completed by year end 1991, it will connect exchanges in ten East German cities and

link them to the West German network. The second phase, scheduled for completion by year-end 1993, calls for nationwide expansion to other urban areas.

Other aspects of the plan call for geographic expansion of the public telephone network, a packet switched data network, and a mobile communications system in East Germany. By 1997, DB TELEKOM plans to have in East Germany 7.2 million additional telephone lines, 36,000 fax terminals installed, 50,000 packet switched connections, and 300,000 mobile telephone subscribers.

TELECOMMUNICATIONS MARKET

The West German telecommunications market is the fourth largest in the world. Total telecommunications equipment expenditures increased from $5.3 billion in 1988 to $6.8 billion in 1990. With German reunification and the extensive rebuilding that will be needed, the total German market will amount to almost $10 billion by 1992 and over $12 billion by 1995. With this growth, Germany will surpass Japan as the third largest telecommunications market in the world.

In terms of product categories, central office switches, transmission equipment, and mobile communications equipment will present the largest opportunities. The market for central office switches is expected to increase from $1.1 billion in 1988 to $1.3 billion in 1990. With unification, the switch market will jump dramatically to $2.2 billion by 1995. Similar trends will

be witnessed in transmission equipment, where the market is expected to rise from $995.3 million in 1988 to $1.1 billion by 1990. The combined transmission marketplace is expected to grow rapidly to $2.3 billion by 1995. In mobile communications, 1988 sales of $550 million will rise to $994.5 million by 1990 and $1.8 billion by 1995 for a unified German marketplace.

Roughly 40 percent of telecom sales in West Germany are generated by companies whose capital is principally under foreign ownership (although much of the manufacturing is done domestically). DB TELECOM buys 30 percent of its requirements from Siemens and 20 percent from the German subsidiary of Alcatel.

Despite the fact that the network equipment marketplace is by far the largest, it is not likely to offer the best opportunities for foreign companies. With Siemens one of the largest CO switch manufacturers worldwide and long-time resident supplier to the West German PTT, it will be difficult for foreign countries to make much headway in the network equipment market. The best prospects for foreign companies appear to be in mobile communications and business telecommunications terminal equipment, especially for niche products such as voice processing equipment. These two areas seem to be the ones most likely to experience real competition and two areas where some foreign companies have a competitive edge over German suppliers.

TABLE 16

The German Telecommunications Infrastructure, 1985-1990

WEST GERMANY	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	37,899.1	39,128.0	40,288.4
Total access lines (000)	25,588.6	26,399.3	27,221.8
Residential lines (000)	*17,912.0	*19,799.3	*20,002.2
Business lines (000)	7,676.6	6,600.0	7,219.6
Total Network Access Line Capacity (000)	29,223.4	30,159.0	30,930.1
New applications for service (000)	N/A	N/A	N/A
Total demand for service (includes moves and changes)	2,260.4	2,166.6	2,147.7
Waiting list for new service (000)	28.4	28.1	23.6
Pay telephones in service (000)	162.1	162.8	163.0
Total national traffic (in millions of calls)	27,184.2	28,521.0	29,811.1
Total local traffic (in millions of calls)	17,172.2	18,057.4	18,764.4
Total toll traffic (in millions of calls)	10,012.0	10,463.5	11,046.7
Total outgoing international traffic (in millions of calls)	432.1	468.2	514.2
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	86.5	105.6	129.2
Number of private leased lines (000)	4.3	4.6	4.2
Number of data CPE attached to dedicated public data networks (000)	129.1	146.4	164.4
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$12,016,760.0	$15,644,600.0	$20,450,625.0
Income from other telecom services ($000)	1,459,800.0	2,019,050.0	2,689,812.5
Total income from telecom services ($000)	13,476,560.0	17,663,650.0	23,140,437.5
Total expenses for providing telecom services ($000)	12,050,200.0	15,934,500.0	21,363,312.5
Net income ($000)	1,426,360.0	1,729,150.0	1,777,125.0
Annual investment in the network ($000)	5,898,440.0	9,340,125.0	9,678,187.5
Annual investment for switching equipment ($000)	1,186,360.0	1,365,150.0	1,639,500.0
Ratios:			
Telephone access lines per 100 inhabitants	42.0	43.2	44.1
Telephone penetration per 100 inhabitants	62.1	64.1	65.0
Telecommunications investment as a share of gross domestic product	8.6	8.2	8.2
Telecommunications investment as a share of gross fixed-capital formation	42.1	42.4	42.1

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 16 (Continued)

The German Telecommunications Infrastructure, 1985-1990

WEST GERMANY	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	41,734.5	43,758.2	45,777.4
Total access lines (000)	28,078.6	29,798.6	32,555.4
Residential lines (000)	*21,534.5	21,666.2	23,666.3
Business lines (000)	6,544.1	8,132.4	8,889.1
Total network access line capacity (000)	30,930.1	31,253.4	34,556.7
New applications for service (000)	N/A	N/A	N/A
Total demand for service (includes moves and changes)	2,200.7	2,570.4	2,755.4
Waiting list for new service (000)	25.5	28.6	22.4
Pay telephones in service (000)	218.2	218.5	219.0
Total national traffic (in millions of calls)	29,810.4	30,215.4	34,556.7
Total local traffic (in millions of calls)	18,084.1	19,725.6	20,858.3
Total toll traffic (in millions of calls)	11,726.3	12,555.4	13,698.4
Total outgoing international traffic (in millions of calls)	600.4	710.6	772.4
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	160.8	161.5	167.4
Number of private leased lines (000)	4.8	5.4	6.3
Number of data CPE attached to the dedicated public data networks (000)	184.3	205.4	210.7
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$18,309,000.0	$19,735,654.5	$21,250,788.5
Income from other telecom services ($000)	2,482,555.5	2,675,432.4	2,950,125.6
Total income from telecom services ($000)	20,791,555.5	22,411,086.9	24,200,914.1
Total expenses for providing telecom services ($000)	19,102,778.1	20,555,621.1	21,998,576.5
Net income ($000)	1,688,777.4	1,855,465.8	2,202,337.6
Annual investment in the network ($000)	8,716,889.1	9,004,321.5	10,576,233.7
Annual investment for switching equipment ($000)	1,255,611.1	1,350,648.2	1,995,676.4
Ratios:			
Telephone access lines per 100 inhabitants	46.0	48.0	50.2
Telephone penetration per 100 inhabitants	68.2	72.5	75.0
Telecommunications investment as a share of gross domestic product	*8.5	8.9	9.0
Telecommunications investment as a share of gross fixed-capital formation	39.1	40.4	41.2

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 17

The German Telecommunications Equipment Marketplace, 1988-1995

GERMANY*	1988	1989	1990	1991
Central Office Switches: $ millions	$ 1,056.2	$ 1,114.7	$ 1,276.5	$ 1,750.0
Transmission Equipment: $ millions	995.3	1,014.7	1,125.8	1,627.9
Cables: $ millions	805.3	810.7	875.4	1,225.5
Satellites: $ millions	45.6	54.7	67.3	85.2
Data Communications Equipment: $ millions	80.4	89.7	95.6	125.4
PBX:				
Total value: $ millions	650.1	675.4	690.6	770.1
Total lines sold annually (000 lines)	1,083.3	1,125.0	1,160.7	1,296.6
Total installed lines (000 lines)	7,225.4	7,500.0	7,843.6	8,644.0
Key Systems:				
Total value: $ millions	90.5	90.8	92.5	130.9
Total lines sold annually (000 lines)	362.0	363.2	370.1	523.6
Total installed lines (000 lines)	2,413.3	2,421.3	2,467.3	3,490.7
Facsimile Equipment: $ millions	565.4	750.5	790.5	815.5
Other CPE: $ millions	100.2	175.9	220.6	401.3
Mobile Communications:				
Total value: $ millions	550.4	704.0	994.5	1,255.6
Cellular market: $ millions	296.4	403.2	650.7	876.2
Cellular subscribers (000)	100.1	165.0	325.4	438.1
Other Equipment	375.4	510.3	600.3	705.8
Total Value: $ millions	$ 5,315.0	$ 5,991.4	$ 6,830.0	$ 8,808.0

* Includes German Democratic Republic after 1990

TABLE 17 (Continued)

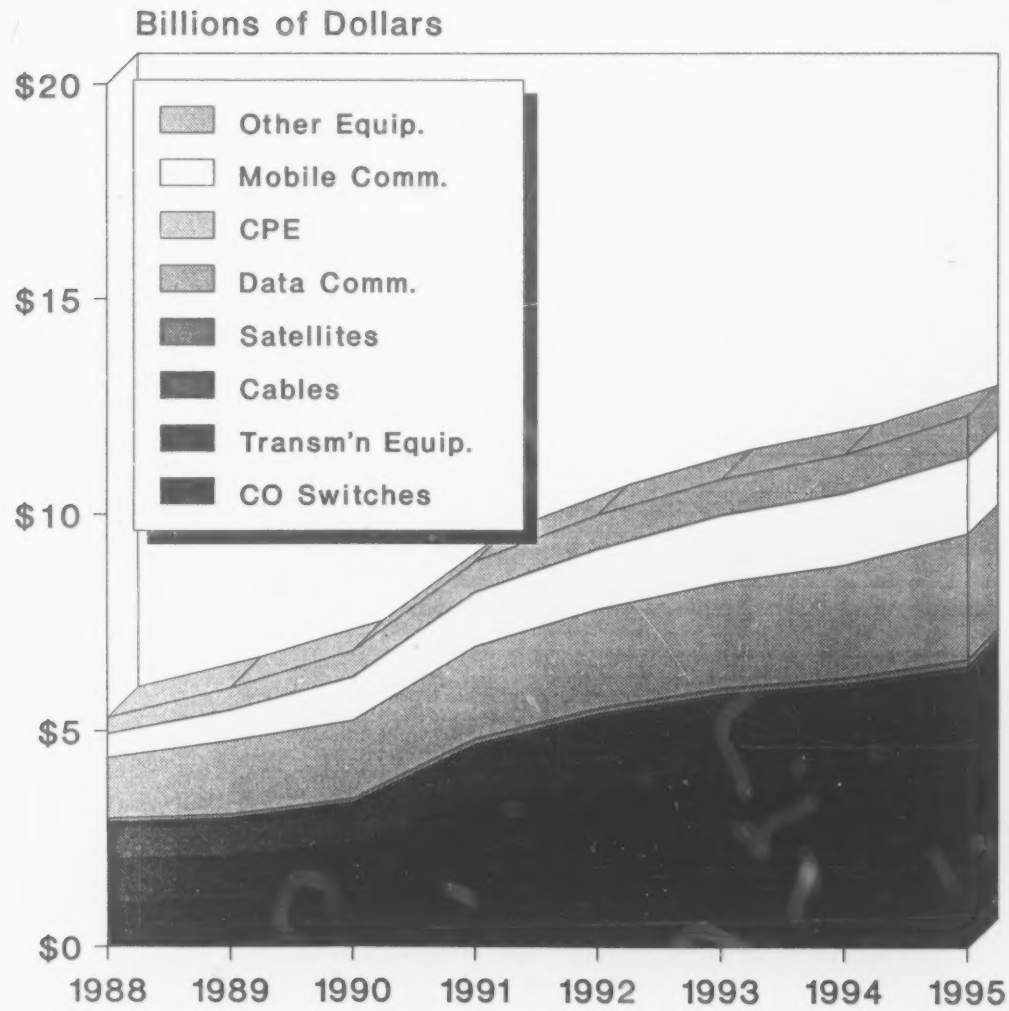
The German Telecommunications Equipment Marketplace, 1988-1995

GERMANY*	1992	1993	1994	1995
Central Office Switches: $ millions	$ 1,875.4	$ 2,076.9	$ 2,114.3	$ 2,205.0
Transmission Equipment: $ millions	1,855.3	1,996.4	2,103.8	2,345.8
Cables: $ millions	1,575.2	1,680.4	1,750.3	1,825.0
Satellites: $ millions	91.6	101.4	113.7	121.5
Data Communications Equipment: $ millions	130.9	139.7	145.6	159.0
PBX:				
Total value: $ millions	815.8	895.3	921.3	1,011.7
Total lines sold annually (000 lines)	1,389.9	1,492.2	1,555.6	1,605.5
Total installed lines (000 lines)	8,686.9	9,326.3	9,722.5	10,316.0
Key Systems:				
Total value: $ millions	134.3	149.6	155.4	159.9
Total lines sold annually (000 lines)	537.2	598.4	647.5	666.6
Total installed lines (000 lines)	3,837.1	4,274.3	4,625.0	4,761.4
Facsimile Equipment: $ millions	880.4	910.6	1,004.3	1,124.9
Other CPE: $ millions	435.4	456.9	510.8	595.9
Mobile Communications:				
Total value: $ millions	1,388.9	1,569.4	1,675.0	1,800.2
Cellular market: $ millions	915.5	1,007.1	1,122.3	1,345.6
Cellular subscribers (000)	472.6	530.6	590.7	708.2
Other Equipment	799.6	839.8	900.3	964.3
Total Value: $ millions	$ 9,983.0	$10,816.4	$11,395.0	$12,313.2

Includes German Democratic Republic after 1990

FIGURE 8

German* Market for Telecommunications Equipment 1988 - 1995



Includes G.D.R. after 1990

GREECE

BACKGROUND

Greece joined the European Community in 1981 as its tenth member. It is a moderately sized country occupying 50,944 square miles. It is the most southeastern EC member. It is bounded by Albania, Yugoslavia, and Bulgaria to the north, Turkey to the east, the Mediterranean to the south, and the Aegean Sea to the west. The population of Greece is approximately 10.2 million people with close to 3.3 million households. Estimated GNP for 1989 amounted to $47 billion. The capital is Athens. The government of Greece is a unitary multi-party republic with one legislative body. The head of the government is the Prime Minister.

Overall authority for telecommunications in Greece rests with the Ministry of Transport and Communications. The Hellenic Telecommunicaions Organization (OTE) is a government-owned corporation operating as a public utility.

OTE is organized into 26 administrative departments, of which five are regional departments responsible for telecommunications services in Northern Greece, South and West Greece, Central Greece, Athens, Piraeus and the islands. Other departments operate as directorates concerned with development, research, investment, and administration.

Both the Ministry of Transport and Communications and the Ministry of National Economy exercise financial control over OTE. Greece has been one of the principal beneficiaries of the EC STAR program (see page 167).

TELECOMMUNICATIONS POLICY

OTE halds a monopoly on the provision of networks for telecommunications and the provision of a customer's first telephone and radio pagers. There is an open market for all other types of terminal equipment and type approval is exercised by the OTE.

Procurement policies for major telecommunications network equipment are designed to give preferential treatment to Greek companies or foreign companies with Greek partners. OTE also requires that when a foreign company wins a public procurement bid it gradually phase in domestically-made products into the final package.

Greece has been slow to embrace the market-opening measures of the EC Commission. In fact, in some cases Greece has sought official postponement of the implementation of some of the directives to give its infrastructure time to catch up.

TELECOMMUNICATIONS INFRASTRUCTURE

The Greek telecommunications network is one of the most antiquated in the EC. Many of the services that are taken for granted in other countries, such as digital private lines, are unavailable. That means, for instance, that Olympic Airways, the Greek national airline, cannot efficiently hook up to a computerized international information and reservation system.

The Greek government, and OTE in particular, want to change that. They want to attract new businesses to Greece as the European Community unites economically. With relatively low labor rates, Greece is a likely location for assembly facilities. However, an advanced telecommunications network will be necessary to coordinate supplies and shipments.

To this end, Greek authorities have outlined a number of objectives for network modernization and expansion. These include network enhancements for digital switching, paging, video, text, facsimile, mobile communications, and data communications. In addition, the Greek government is stressing the stimulation of rural communications. Telephones are to be installed in 2,000 villages over the coming years. OTE also expects to have 1.2 million digital lines by 1993 as part of a three year $260 million telecommunications upgrade program.

Overall, Greece has 4.4 million telephones in use. Approximately 45 percent of all Greeks have a telephone. Total national telecommunications traffic has increased steadily from 6.9 billion calls in 1985 to an estimated 7.7 billion calls in 1989. Greece's network currently has 1,400 exchanges, 230 transit switches, and 43 main exchanges.

OTE earned an estimated $1.0 billion from providing telecommunications services in 1989, up from $510.4 million in 1985. The bulk of the revenue comes from basic telephone service, with less than 15 percent from other services.

TELECOMMUNICATIONS MARKET

With so far to go to reach the level of most other EC members, the Greek market for telecommunications is likely to develop rapidly over the next few years. The total market for telecommunications equipment is expected to increase from $323.6 million in 1988 to $434.0 million in 1990 and to $683.1 million by 1995.

The best opportunities are likely to be in switching, transmission, mobile communications, and data communications. As the nation converts from electromechanical switches, still in place in most areas, to digital switching technology, the market for central office switches will more than double from $94.3 million in 1988 to $185.6 million by 1995. Likewise the market for transmission equipment will skyrocket from $70.4 million in 1988 to $136.9 million by 1995. Mobile communications, a very high priority for Greece, will grow even more rapidly from $18.5 million in 1988 to $75.9 million by 1995. The market for data communications equipment will develop from $25.4 million in 1988 to $53.7 million by 1995.

TABLE 18

The Greek Telecommunications Infrastructure

GREECE	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	3,721.0	3,920.1	4,126.0
Total Access Lines (000)	3,117.1	3,292.1	3,466.0
Residential lines (000)	2,151.1	2,272.0	2,392.0
Business lines (000)	966.1	1,020.0	1,074.1
Total network access line capacity (000)	3,328.3	3,466.4	3,603.2
New applications for service (000)	279.1	275.0	252.4
Total demand for service (includes moves and changes)	485.1	503.0	496.1
Waiting list for new service (000)	970.3	1,015.3	1,051.2
Pay telephones in service (000)	*62.0	*62.0	62.5
Total national traffic (in millions of calls)	6,892.3	8,407.6	6,580.1
Total local traffic (in millions of calls)	6,150.0	7,719.2	5,905.1
Total toll traffic (in millions of calls)	743.1	688.1	675.1
Total outgoing international traffic (in millions of calls)	29.1	30.3	31.2
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	.3	.4	.5
Number of private leased lines (000)	2.0	2.2	2.6
Number of data CPE attached to dedicated public data networks (000)	N/A	N/A	N/A
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 441,582.3	$ 637,426.3	$ 819,786.0
Income from other telecom services ($000)	68,768.0	90,206.3	143,779.1
Total income from telecom services ($000)	510,350.3	727,632.6	963,565.1
Total expenses for providing telecom services ($000)	501,080.4	604,680.0	805,818.3
Net income ($000)	9,269.9	122,952.6	157,746.8
Annual investment in the network ($000)	191,668.8	143,329.0	196,802.1
Annual investment for switching equipment ($000)	2,849.4	15,385.1	1,214.3
Ratios:			
Telephone access lines per 100 inhabitants	31.3	33.0	33.0
Telephone penetration per 100 inhabitants	37.4	39.3	41.3
Telecommunications investment as a share of gross domestic product	8.3	4.6	5.1
Telecommunications investment as a share of gross fixed-capital formation	39.0	22.0	24.1

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 18 (Continued)

The Greek Telecommunications Infrastructure

GREECE	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	4,303.2	4,412.5	4,499.5
Total access lines (000)	3,616.0	3,895.6	4,052.4
Residential lines (000)	2,495.0	2,798.1	2,905.6
Business lines (000)	1,121.1	1,097.5	1,146.8
Total network access line capacity (000)	3,784.1	3,991.4	4,125.4
New applications for service (000)	260.0	265.1	274.2
Total demand for service (includes moves and changes)	494.0	510.4	515.4
Waiting list for new service (000)	1,053.7	1,055.4	1,050.1
Pay telephones in service (000)	58.8	59.4	59.9
Total national traffic (in millions of calls)	*6,935.9	7,665.9	7,995.4
Total local traffic (in millions of calls)	*6,250.5	6,975.5	7,184.5
Total toll traffic (in millions of calls)	*685.4	*690.4	810.9
Total outgoing international traffic (in millions of calls)	*32.5	33.5	35.4
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	*.6	.8	.9
Number of private leased lines (000)	3.1	3.4	3.4
Number of data CPE attached to the dedicated public data networks (000)	N/A	N/A	N/A
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 851,319.4	$ 876,554.5	$ 900,454.4
Income from other telecom services ($000)	149,037.1	154,333.4	161,451.2
Total income from telecom services ($000)	1,000,356.5	1,030,887.9	1,061,905.6
Total expenses for providing telecom services ($000)	787,616.5	795,215.3	804,556.4
Net income ($000)	212,740.0	235,672.6	257,349.2
Annual investment in the network ($000)	210,061.4	215,333.0	219,226.7
Annual investment for switching equipment ($000)	7,786.1	7,995.4	8,025.4
Ratios:			
Telephone access lines per 100 inhabitants	36.1	38.2	38.9
Telephone penetration per 100 inhabitants	43.0	45.4	47.5
Telecommunications investment as a share of gross domestic product	5.3	5.7	6.0
Telecommunications investment as a share of gross fixed-capital formation	25.1	26.2	27.4

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 19

The Greek Telecommunications Equipment Marketplace

GREECE	1988	1989	1990	1991
Central Office Switches: $ millions	$ 94.3	$ 104.4	$ 125.4	$ 155.4
Transmission Equipment: $ millions	70.4	85.9	96.5	101.5
Cables: $ millions	35.9	39.8	43.6	45.0
Satellites: $ millions	17.6	24.3	28.6	35.4
Data Communications Equipment: $ millions	25.4	30.0	33.7	37.9
PBX:				
Total value: $ millions	20.5	25.7	32.6	35.8
Total lines sold annually (000 lines)	34.8	42.2	54.9	59.3
Total installed lines (000 lines)	308.5	320.6	417.9	426.2
Key Systems:				
Total value: $ millions	4.6	5.3	5.7	5.9
Total lines sold annually (000 lines)	18.9	21.3	22.7	23.5
Total installed lines (000 lines)	141.5	163.0	175.4	181.5
Facsimile Equipment: $ millions	10.5	12.3	15.5	20.7
Other CPE: $ millions	15.5	15.3	17.5	20.5
Mobile Communications:				
Total value: $ millions	18.5	20.2	21.5	28.0
Cellular market: $ millions	-0-	10.2	15.4	21.3
Cellular subscribers (000)	-0-	-0-	5.2	10.5
Other Equipment	10.4	12.1	13.2	13.5
Total: $ millions	$ 323.6	$ 375.3	$ 434.0	$ 500.0

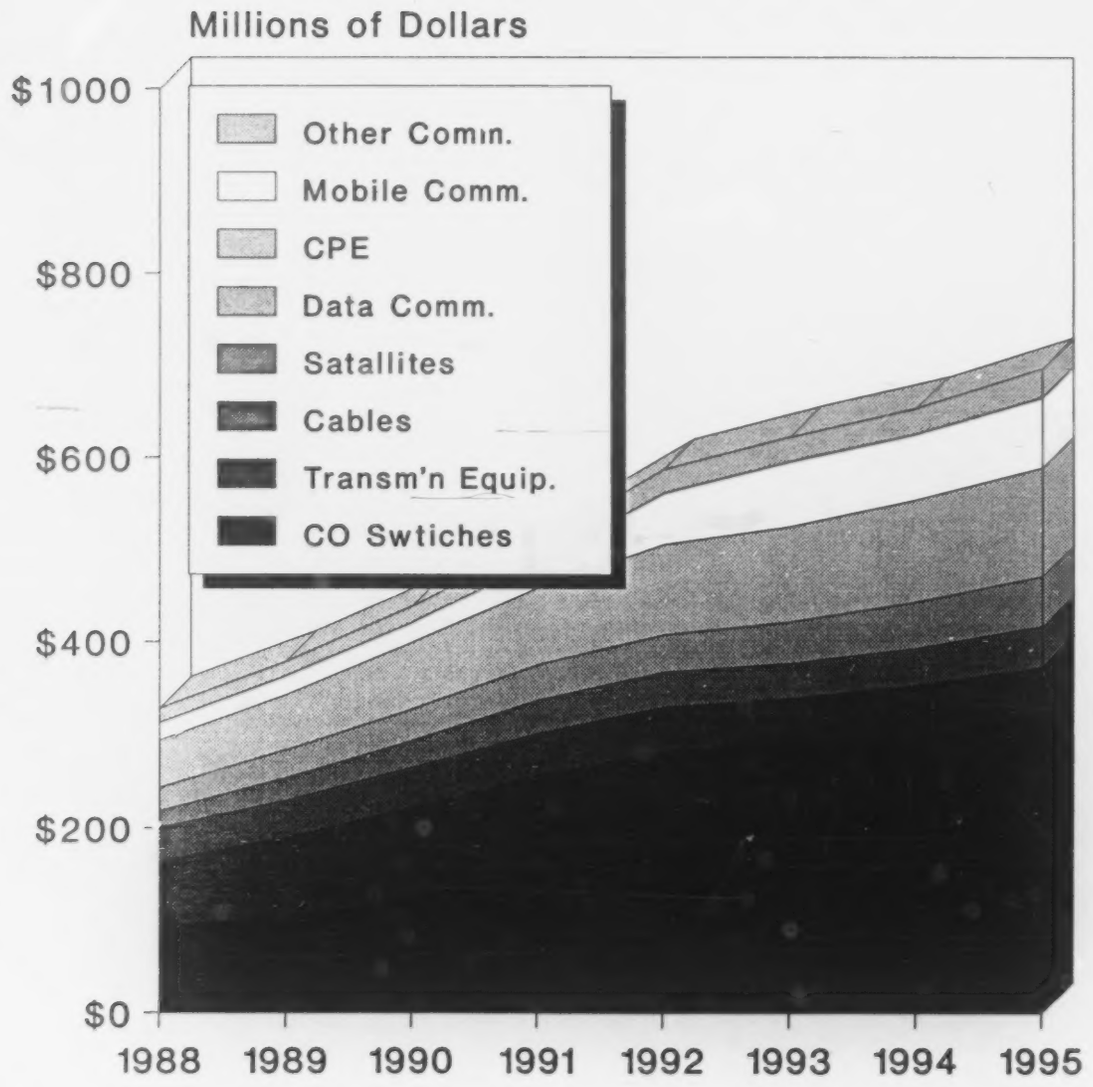
TABLE 19 (Continued)

The Greek Telecommunications Equipment Marketplace

GREECE	1992	1993	1994	1995
Central Office Switches: $ millions	$ 170.6	$ 175.4	$ 177.9	$ 185.6
Transmission Equipment: $ millions	112.3	117.6	125.8	136.9
Cables: $ millions	47.6	46.5	50.4	51.3
Satellites: $ millions	37.1	37.7	39.4	43.6
Data Communications Equipment: $ millions	39.6	44.6	49.8	53.7
PBX:				
Total value: $ millions	36.0	37.4	38.9	40.1
Total lines sold annually (000 lines)	60.7	62.7	64.0	66.1
Total installed lines (000 lines)	428.6	445.2	446.0	451.0
Key Systems:				
Total value: $ millions	6.0	6.1	6.0	6.0
Total lines sold annually (000 lines)	24.1	24.3	25.2	25.3
Total installed lines (000 lines)	181.8	182.0	183.7	184.5
Facsimile Equipment: $ millions	30.2	32.5	37.6	40.5
Other CPE: $ millions	25.7	27.0	28.1	31.5
Mobile Communications:				
Total value: $ millions	55.6	70.5	71.7	75.9
Cellular market: $ millions	49.7	61.2	62.5	70.7
Cellular subscribers (000)	25.4	30.6	33.5	41.6
Other Equipment	14.1	15.0	16.0	18.0
Total: $ millions	$ 575.0	$ 610.3	$ 642.0	$ 683.1

FIGURE 9

Greek Market for Telecommunications Equipment 1988 - 1995



IRELAND

BACKGROUND

The Republic of Ireland (Ireland) joined the European Community with Denmark and the United Kingdom in 1973. It is a rather small island country covering 32,052 square miles located west of the United Kingdom. Ireland shares the island with Northern Ireland, part of the United Kingdom. The population of Ireland is about 3.8 million people and about 950,000 households. Estimated GNP for 1989 amounted to $33.0 billion. The capital of Ireland is Dublin. The government is a unitary multi-party republic with two legislative bodies. The head of the government is the Prime Minister.

In Ireland, the Department of Communications regulates telecommunications. The network operator, Telecom Eireann, is a wholly-owned government corporation. Telecom Eireann is subdivided into five Directorates based on logistical considerations. It operates under the control of a Chief Executive responsible to a board of directors.

TELECOMMUNICATIONS POLICY

Telecom Eireann maintains a monopoly over all infrastructure and services in Ireland. Since July 1990, when Telecom Eireann lost its monopoly over the customer's first telephone, the market for all terminal equipment has been open to competition.

In conjunction with the Institute for Industrial Research, the Department of Communicaions administers the approvals and certification procedures and issues licenses to equipment

manufacturers and vendors. In this way the Department of Communications still maintains some control over the connection of equipment to the network.

Telecom Eireann retains some regulatory powers and can grant licenses to third parties for the operation of telecommunications services. If Telecom Eireann refuses a license, the applicant can appeal to the Department of Communications. In theory at least, it is possible for private companies to provide telecommunications services in Ireland.

In general, the resale of capacity on leased circuits or the interconnection of private networks with the public network is not permitted, but exceptions are granted on a case-by-case basis.

TELECOMMUNICATIONS INFRASTRUCTURE

The telecommunications infrastucture in Ireland has traditionally been one of the least advanced of the EC, and Telecom Eireann has a reputation for very slow, inefficient service. That is changing, however, as Ireland is looking to become an international telecommunications gateway to the EC, especially between Europe and North America. Telecom Eireann, fighting hard to shed its past image, has greatly reduced the lead time for ordering leased lines while also improving the quality of the lines and the responsiveness to customers.

There are about 1,000 local switches and 8 trunk switches in Ireland. The movement to digital, one of Telecom Eireann's primary objectives, is well underway. Other goals are to improve responsiveness, so that telephone lines will be installed within six weeks of an order, telex lines

within three weeks, and so that 90 percent of data connections orders are fulfilled within two weeks. Additionally, Telecom Eireann wants to focus on data and mobile communications as well as international satellite and fiber optic links.

In total, there are approximately 1.1 million telephones in use in Ireland, the bulk of which are for residential use. Of every 100 inhabitants in Ireland in 1989, approximately 42 have telephone service. Telecom Eireann wants to increase that to 75 percent by 1995.

The total number of telephone calls placed increased steadily from 2.3 billion in 1985 to 3.1 billion in 1989. In Telecom Eireann's five-year plan, the company intends to boost telephone traffic 45 percent by 1995.

The number of data terminals attached to the public telephone network grew rapidly from 7,500 in 1985 to 12,100 in 1989. At the same time, the number of data terminals attached to the public data network jumped dramatically from 400 in 1985 to 3,400 in 1989. The number of leased lines more than doubled from 4,200 in 1985 to 9,200 in 1989. With the introduction of a new national leased line network, DASSNET, the number and quality of leased lines should increase measurably over the coming years.

Telecom Eireann earned a total of $880.7 million in 1989, up from $558.1 million in 1985. About 90 percent of the revenue is derived from providing basic telephone service.

TELECOMMUNICATIONS MARKET

As a major recipient of funds from the EC STAR program, and with the aggressive development projects of Telecom Eireann, the telecommunications market in Ireland looks promising. The total market for telecommunications equipment is expected to grow from $113.0 million in 1988 to $168.0 million in 1990 and to $283.0 million by 1995.

The major growth market will be for central office switching equipment which is expected to increase from $33.6 million in 1988 to $47.6 million in 1990 before jumping to $81.5 million in 1995. With Telecom Eireann's push in digital microwave and other digital transmission, the market for transmission equipment will grow rapidly, almost doubling from $20.4 million in 1988 to $37.6 million in 1990 and almost doubling again to $68.5 million in 1995. The market for mobile communications equipment, also a top priority for Telecom Eireann, will rise from $20.5 million in 1988 to $50.2 million by 1995.

As with other EC countries, the most promising Irish markets for non-EC suppliers are products for business customers. However, because ther is no major telecommunications network equipment manufacturer in Ireland, there will likely be opportunities for outsiders in that area as well. The most successful foreign companies will set up facilities in Ireland to enhance their position with the network operators. Moreover, Ireland is a good country to use as a springboard for sales to the EC as a whole. It has an educated, English-speaking workforce, a good business climate, relatively low wage rates, and is hungry for foreign investment.

TABLE 20

Irish Telecommunications Infrastructure, 1985-1990

IRELAND	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	942.0	1,013.8	*1,074.6
Total access lines (000)	703.0	751.0	796.2
Residential lines (000)	449.2	503.2	541.4
Business lines (000)	253.8	247.8	254.8
Total network access line capacity (000)	949.1	1,002.1	1,041.0
New applications for service (000)	64.0	74.2	67.0
Total demand for service (includes moves and changes)	74.3	88.1	82.2
Waiting list for new service (000)	28.0	21.0	15.1
Pay telephones in service (000)	*4.1	*4.2	4.2
Total national traffic (in millions of calls)	2,329.0	2,455.1	2,755.5
Total local traffic (in millions of calls)	1,746.8	1,841.3	2,066.8
Total toll traffic (in millions of calls)	582.2	613.8	688.7
Total outgoing international traffic (in millions of calls)	N/A	N/A	N/A
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	7.5	*8.0	*8.9
Number of private leased lines (000)	4.2	5.0	5.5
Number of data CPE attached to dedicated public data networks (000)	0.4	0.7	1.3
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 507,500.0	$ 621,100.0	$ 710,000.0
Income from other telecom services ($000)	50,625.0	88,732.4	67,429.1
Total income from telecom services ($000)	558,125.0	709,832.4	777,429.1
Total expenses for providing telecom services ($000)	602,875.0	737,143.0	761,571.4
Net income ($000)	-44,750.0	-27,310.6	15,857.7
Annual investment in the network ($000)	170,125.8	192,857.6	186,143.1
Annual investment for switching equipment ($000)	61,250.0	11,831.1	51,429.1
Ratios:			
Telephone access lines per 100 inhabitants	20.1	21.2	22.5
Telephone penetration per 100 inhabitants	27.0	32.0	35.4
Telecommunications investment as a share of gross domestic product	8.1	7.5	7.6
Telecommunications investment as a share of gross fixed-capital formation	39.0	39.5	39.0

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 20 (Continued)

Irish Telecommunications Infrastructure, 1985-1990

IRELAND	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	*1,095.9	1,123.0	1,195.5
Total access lines (000)	843.1	905.1	990.6
Residential lines (000)	559.1	594.2	610.4
Business lines (000)	284.0	310.9	380.2
Total network access line capacity (000)	1,115.1	1,200.5	1,225.4
New applications for service (000)	82.1	85.1	90.4
Total demand for service (includes moves and changes)	92.0	92.4	100.2
Waiting list for new service (000)	13.5	13.4	13.0
Pay telephones in service (000)	4.4	4.5	4.5
Total national traffic (in millions of calls)	2,995.1	3,115.1	3,235.7
Total local traffic (in millions of calls)	2,425.0	2,519.9	2,625.4
Total toll traffic (in millions of calls)	570.1	595.2	610.3
Total outgoing international traffic (in millions of calls)	N/A	N/A	N/A
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	*11.0	12.1	13.0
Number of private leased lines (000)	8.0	9.2	9.5
Number of data CPE attached to the dedicated public data networks (000)	2.1	3.4	4.0
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 780,100.0	$ 795,400.1	$ 805,300.5
Income from other telecom services ($000)	84,286.0	85,345.1	87,506.3
Total income from telecom services ($000)	864,386.0	880,745.2	892,806.8
Total expenses for providing telecom services ($000)	800,143.1	819,761.2	829,556.8
Net income ($000)	64,242.9	60,984.0	63,250.0
Annual investment in the network ($000)	188,000.0	190,522.3	201,055.3
Annual investment for switching equipment ($000)	52,857.4	53,566.2	56,068.4
Ratios:			
Telephone access lines per 100 inhabitants	24.0	25.1	26.2
Telephone penetration per 100 inhabitants	39.4	42.5	44.6
Telecommunications investment as a share of gross domestic product	*8.1	8.9	9.4
Telecommunications investment as a share of gross fixed-capital formation	*41.5	42.5	42.6

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 21

Irish Telecommunications Equipment Marketplace, 1988-1995

IRELAND	1988	1989	1990	1991
Central Office Switches: $ millions	$ 33.6	$ 38.9	$ 47.6	$ 55.2
Transmission Equipment: $ millions	20.4	25.7	37.6	43.4
Cables: $ millions	10.5	11.2	12.7	13.6
Satellites: $ millions	2.1	2.4	3.7	5.1
Data Communications Equipment: $ millions	3.2	3.7	4.4	5.6
PBX:				
Total value: $ millions	6.4	6.9	7.1	7.2
Total lines sold annually (000 lines)	10.4	11.3	11.7	11.9
Total installed lines (000 lines)	80.0	87.0	90.3	91.5
Key Systems:				
Total value: $ millions	1.7	1.8	1.8	2.0
Total lines sold annually (000 lines)	6.5	6.6	6.7	7.3
Total installed lines (000 lines)	50.0	50.7	50.8	53.8
Facsimile Equipment: $ millions	4.5	5.7	10.2	13.5
Other CPE: $ millions	5.0	6.2	6.5	7.1
Mobile Communications:				
Total value: $ millions	20.5	27.9	30.9	36.6
Cellular market: $ millions	14.0	22.6	25.5	31.5
Cellular subscribers (000)	3.6	11.2	12.6	16.2
Other Equipment	5.0	5.1	5.4	6.0
Total: $ millions	$ 113.0	$ 136.0	$ 168.0	$ 195.3

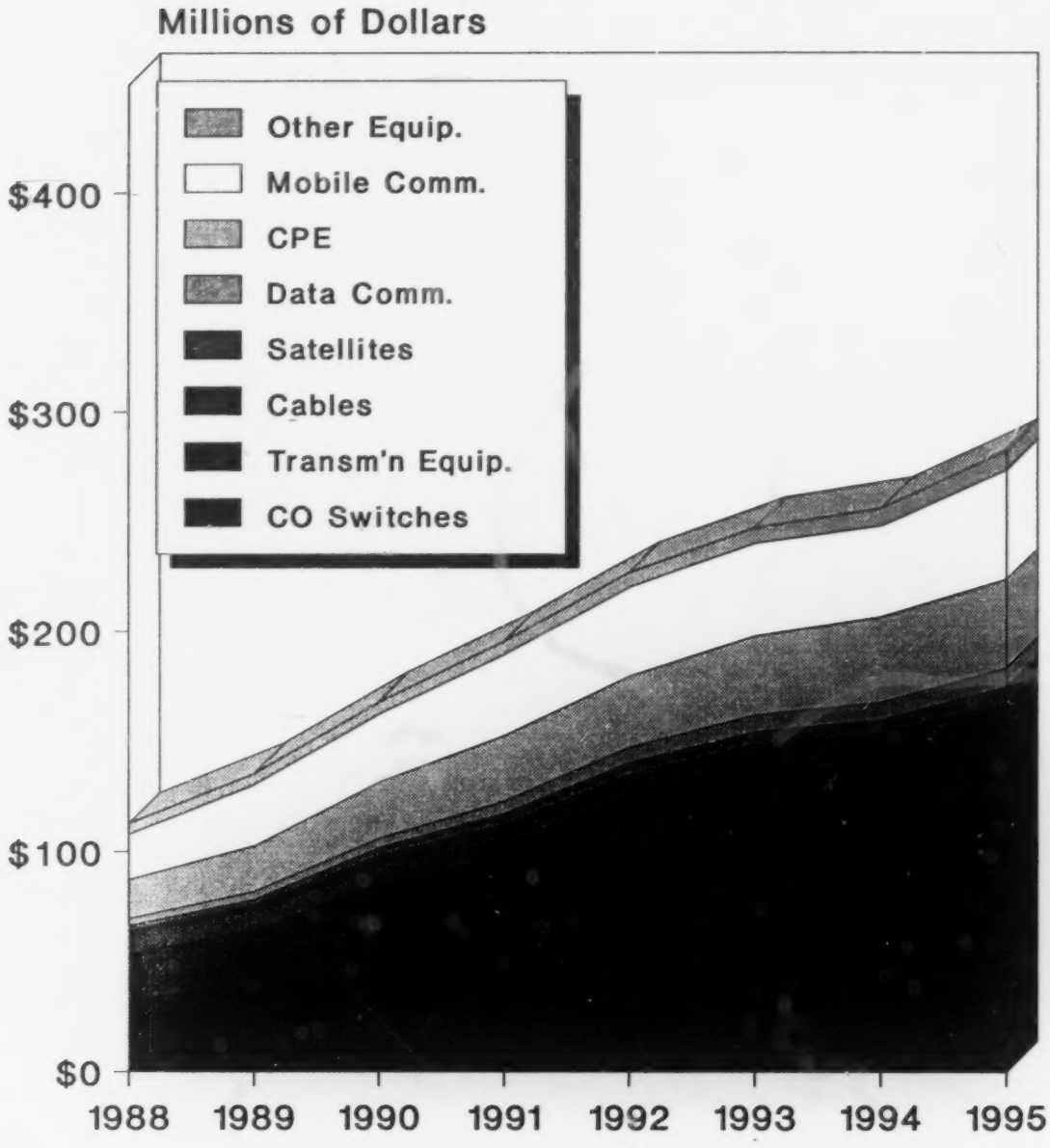
TABLE 21 (Continued)

Irish Telecommunications Equipment Marketplace, 1988-1995

IRELAND	1992	1993	1994	1995
Central Office Switches: $ millions	$ 64.7	$ 69.3	$ 72.3	$ 81.5
Transmission Equipment: $ millions	55.7	64.4	65.7	68.5
Cables: $ millions	14.5	14.9	15.5	17.4
Satellites: $ millions	5.5	5.8	6.3	7.4
Data Communications Equipment: $ millions	7.1	7.6	8.0	8.4
PBX:				
Total value: $ millions	7.4	7.4	8.0	8.1
Total lines sold annually (000 lines)	12.3	12.4	13.4	13.8
Total installed lines (000 lines)	94.9	95.0	96.4	97.0
Key Systems:				
Total value: $ millions	2.1	2.1	2.4	2.7
Total lines sold annually (000 lines)	7.8	8.0	9.0	10.8
Total installed lines (000 lines)	55.1	57.5	60.0	72.0
Facsimile Equipment: $ millions	15.1	16.4	17.1	17.5
Other CPE: $ millions	7.5	10.1	11.2	12.1
Mobile Communications:				
Total value: $ millions	40.4	42.2	41.8	50.2
Cellular market: $ millions	36.2	38.5	37.6	45.5
Cellular subscribers (000)	20.8	22.3	25.1	30.2
Other Equipment	6.8	7.2	8.0	8.9
Total: $ millions	$ 227.0	$ 247.4	$ 256.3	$ 283.0

FIGURE 10

Irish Market for Telecommunications Equipment, 1988 - 1995



ITALY

BACKGROUND

One of the original members of the EC, Italy occupies 116,313 square miles. The country is a boot-shaped peninsula jutting into the Mediterrean Sea. The population of Italy is appoximately 57.4 million people and some 20 million households. In 1989, estimated GNP amounted to some $825 billion. The capital of Italy is Rome. The government is a republic with two legislative houses. The head of the government is the Prime Minister.

Italian telecommunications is a labyrinth of government ministries, ministerial consultative bodies, a public corporation, and five concessionary companies, all sharing responsibility for the provision and regulation of telecommunications services. It is essentially a patchwork of interwoven agencies and committees complicated by elaborate, complex procedures and guidelines.

There is a legal monopoly for the provision of telecommunications services in Italy. These services are controlled 22 percent through the Ministry of Posts and Telecommunications (MPT) and related state agencies and 78 percent through franchisees in the Societa Finanziaria Telefonica P.A. (STET) Group, a holding company. The MPT has the responsibility for overall management and control of telecommunications in Italy.

Under the MPT are two operating agencies and four franchises. The operating agencies are the State Agency for Telephone Services (ASST), responsible for building, managing and maintaining

the long distance network within Italy and with some European and Mediterranean countries; and the Administration of Posts and Telecommunications, responsible for telegraph, telex, and the other services in conjunction with the Societa Italiana per L'Escercizio delle Telecommunicazioni P.A. (SIP).

The franchisees, under the holding company STET, include SIP (domestic services), Italcable (international services with all countries except some European and Mediterranean countries), Telespazio (satellite communications), and RAI (radio and television). At the national level, telephone services are a collaboration between ASST for long distance and SIP for local services. Internationally, ASST handles the traffic that Italcable does not. Draft legislation, presently pending, proposes to transfer all services management to the francisees of the STET Group. The MPT function would thereafter be limited to statutory responsibilities for programming and control.

TELECOMMUNICATIONS POLICY

Until Italy adopts the EC Commission's terminal equipment directive (adoption was scheduled for July 1990 and many countries have complied, but Italy so far has not) the first telephone instrument per household must be leased from SIP. In most cases, competition is legally permitted with all other types of terminal equipment. Competition is also permitted in value-added services.

Recent legislation has lifted the requirement that SIP be the sole entity to maintain private equipment purchased directly by the user. Under the new arrangement, equipment suppliers will provide service, while SIP supervises attachment and collects a technical maintenance fee.

Procurement by government telecommunications entities are subject to strict rules and regulations and favor domestic suppliers. Notice of proposed purchases is often not published. There is no organization or association charged with informing potential suppliers about tenders; only selected firms are contacted directly and invited to submit bids. As a rule, only firms with a presence in Italy are contacted. Companies must guarantee that five years of spare parts are available within Italy for all products supplied to the national telecommunications system. Virtually all procurement of network equipment is done through private negotiations.

Mandatory Italian standards go beyond the minimum necessary to prevent harm to the network, in that they also seek to set minimum standards for quality and performance. In consultation with the Italian Electronics Association, the Instituto Superiore which is under the MPT, is responsible for the development of standards. The procedures for standards and specifications development as well as the certification and type acceptance processes do not give foreign suppliers the same access as domestic suppliers.

TELECOMMUNICATIONS INFRASTRUCTURE

As one might imagine from the complexity of the way telecommunications is adminstered in Italy, the quality of Italian telecommunications services is poor. When service complaints come in, the various operators point fingers at each other. Organizational problems plague development efforts as well. Equipment is outdated, tariffs need restructuring, and the introduction of new services needs to be accelerated. Even with Italpac, the national packet switched network introduced only four years ago, the service quality is inconsistent and finger pointing is common when things go wrong. New developments may lead to improved service, but users are skeptical about how effective they will be.

In 1989 there were about 31.2 million telephones in Italy attached to 21.5 million access lines. Approximately 55 percent of all Italians have access to telephone service. The national network handled approximately 22.6 billion telephone calls in 1989, of which 73 percent were local calls. There were 90,500 data CPE attached to the telephone network in 1989, a substantial increase over the 32,100 in use in 1985. With a new packet switched network, the number of CPE attached to public data networks has grown from 135,100 in 1985 to 257,400 in 1989. Combined, the carriers earned $14.1 billion in 1989, of which $12.6 billion was from basic telephone service.

TELECOMMUNICATIONS MARKET

Given the state of telecommunications in Italy, the network is in need of considerable modernization. In 1986, the Italian government embarked on a ten-year, $40 billion telecommunications expansion and modernization plan. For some, the market is likely to be a bonanza. For others, especially foreign firms with little or no Italian presence, the market will likely to continue to be difficult to crack.

The total Italian telecommunications market will more than double from $3.2 billion in 1988 to $6.9 billion by 1995. The fastest growing product sectors will be data communications equipment, transmission equipment, and mobile communications. The market for data communications equipment is expected to grow from $350.4 million in 1988 to $505.4 million in 1990. After 1990, growth should accelerate, and by 1995 the data communications equipment market should exceed $1.6 billion. The market for transmission equipment is also set to expand dramatically from $615.6 million in 1988 to $1.0 billion by 1995. Moreover, the market for mobile communications equipment will explode from $105.4 million in 1988 to nearly a whopping $1.0 billion by 1995.

In the near term, the Italian telecommunications market will be complicated and fragmented. Companies hoping to penetrate the Italian market will find that a local presence is almost a prerequisite. Establishing a joint venture with an Italian firm is another good way to gain market entry. One of the most celebrated is the 1989 joint venture between AT&T and Italtel, one of

Italy's leading telecom manufacturers. This venture, which involves an equity swap, will concentrate on adapting AT&T's successful 5ESS switch for the Italian and other European markets. The move is likely to be more successful for AT&T than its previous joint venture with Dutch producer, Philips. AT&T will get instant access to the protected multibillion dollar Italian marketplace, primed for major infrastucture expansion.

For foreign producers wanting to keep investment in Italy to a minimum, the business telecommunications marketplace holds appeal. Some local presence will still be important, but Italy is likely to experience some liberalizing of the terminal equipment market along the lines of EC directives. In addition, Italian business customers are putting increasing pressure on the government to reform this sector. Such progress should enable aggressive, determined suppliers willing to endure the bureaucratic intricacies to achieve success. The market for PBXs, key systems, voice mail and other types of CPE including fax terminals is expected to grow from over $625 million in 1988 to about $1.4 billion by 1995.

TABLE 22

The Italian Telecommunications Infrastructure, 1985-1990

ITALY	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	25,615.1	26,874.0	28,052.2
Total access lines (000)	17,396.1	18,253.1	19,105.0
Residential lines (000)	13,743.0	14,420.0	15,093.0
Business lines (000)	3,653.1	3,833.1	4,012.0
Total network access line capacity (000)	19,258.4	20,260.5	21,185.0
New applications for service (000)	1,044.3	1,087.0	1,139.1
Total demand for service (includes moves and changes)	1,349.0	1,448.0	1,522.1
Waiting list for new service (000)	330.1	265.5	201.1
Pay telephones in service (000)	*439.6	*440.7	440.8
Total national traffic (in millions of calls)	17,578.0	18,451.0	19,663.2
Total local traffic (in millions of calls)	12,215.0	12,739.0	13,450.0
Total toll traffic (in millions of calls)	5,363.0	5,712.0	6,213.3
Total outgoing international traffic (in millions of calls)	128.2	141.1	164.3
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	32.1	41.3	55.5
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to dedicated public data networks (000)	135.1	157.2	192.1
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 6,382,593.2	$ 9,071,394.1	$11,821,545.0
Income from other telecom services ($000)	814,878.0	1,204,778.1	1,300,145.0
Total income from telecom services ($000)	7,197,471.1	10,276,172.2	13,121,690.0
Total expenses for providing telecom services ($000)	6,884,124.5	9,658,115.0	12,380,105.2
Net income ($000)	313,346.6	618,057.2	741,584.8
Annual investment in the network ($000)	N/A	N/A	N/A
Annual investment for switching equipment ($000)	N/A	N/A	N/A
Ratios:			
Telephone access lines per 100 inhabitants	30.4	32.1	33.3
Telephone penetration per 100 inhabitants	45.0	47.1	49.1
Telecommunications investment as a share of gross domestic product	7.1	6.5	6.5
Telecommunications investment as a share of gross fixed-capital formation	31.4	31.0	31.1

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 22 (Continued)

The Italian Telecommunications Infrastructure, 1985-1990

ITALY	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	29,300.1	31,250.5	32,540.5
Total access lines (000)	20,092.0	21,511.4	22,966.7
Residential lines (000)	15,873.1	16,273.5	17,034.5
Business lines (000)	4,218.9	5,237.9	5,932.2
Total network access line capacity (000)	22,275.3	24,333.5	25,004.3
New applications for service (000)	1,123.4	1,150.4	1,201.4
Total demand for service (includes moves and changes)	1,677.0	1,750.5	1,851.3
Waiting list for new service (000)	119.0	105.0	103.2
Pay telephones in service (000)	440.9	441.0	442.0
Total national traffic (in millions of calls)	21,101.0	22,575.4	23,976.1
Total local traffic (in millions of calls)	14,275.0	15,733.5	16,551.4
Total toll traffic (in millions of calls)	6,826.2	7,156.5	7,424.7
Total outgoing international traffic (in millions of calls)	195.4	202.4	204.5
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	73.1	90.5	91.4
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to the dedicated public data networks (000)	228.5	257.4	264.5
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$11,771,845.2	$12,573,454.1	$13,110,215.1
Income from other telecom services ($000)	1,104,309.0	1,573,444.2	1,814,331.2
Total income from telecom services ($000)	12,876,154.2	14,146,898.3	14,924,546.3
Total expenses for providing telecom services ($000)	12,148,738.2	13,254,345.2	13,954,263.0
Net income ($000)	727,416.0	892,553.1	970,283.3
Annual investment in the network ($000)	N/A	N/A	N/A
Annual investment for switching equipment ($000)	N/A	N/A	N/A
Ratios:			
Telephone access lines per 100 inhabitants	35.0	37.2	39.5
Telephone penetration per 100 inhabitants	51.0	55.4	56.5
Telecommunications investment as a share of gross domestic product	7.3	7.8	7.7
Telecommunications investment as a share of gross fixed-capital formation	34.1	35.1	35.1

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 23

The Italian Telecommunications Equipment Marketplace, 1988-1995

ITALY	1988	1989	1990	1991
Central Office Switches: $ millions	$ 675.5	$ 763.4	$ 694.5	$ 710.4
Transmission Equipment: $ millions	615.6	695.3	750.5	870.5
Cables: $ millions	505.4	551.3	610.5	615.4
Satellites: $ millions	80.3	101.4	110.5	147.6
Data Communications Equipment: $ millions	350.4	475.7	505.4	715.8
PBX:				
Total value: $ millions	242.1	265.5	295.5	314.7
Total lines sold annually (000 lines)	403.5	426.4	492.5	528.9
Total installed lines (000 lines)	2,690.5	2,756.4	3,283.3	3,526.0
Key Systems:				
Total value: $ millions	55.0	60.3	62.4	63.7
Total lines sold annually (000 lines)	220.1	241.3	249.6	260.4
Total installed lines (000 lines)	1,577.5	1,723.6	1,782.9	1,860.0
Facsimile Equipment: $ millions	173.6	185.9	188.4	192.5
Other CPE: $ millions	150.4	210.3	375.5	402.3
Mobile Communications:				
Total value: $ millions	105.4	575.3	725.6	800.6
Cellular market: $ millions	56.3	165.9	510.3	596.4
Cellular subscribers (000)	25.6	75.0	231.9	298.2
Other Equipment	245.6	273.5	285.4	301.2
Total $:	$ 3,199.3	$ 4,158.0	$ 4,604.2	$ 5,135.0

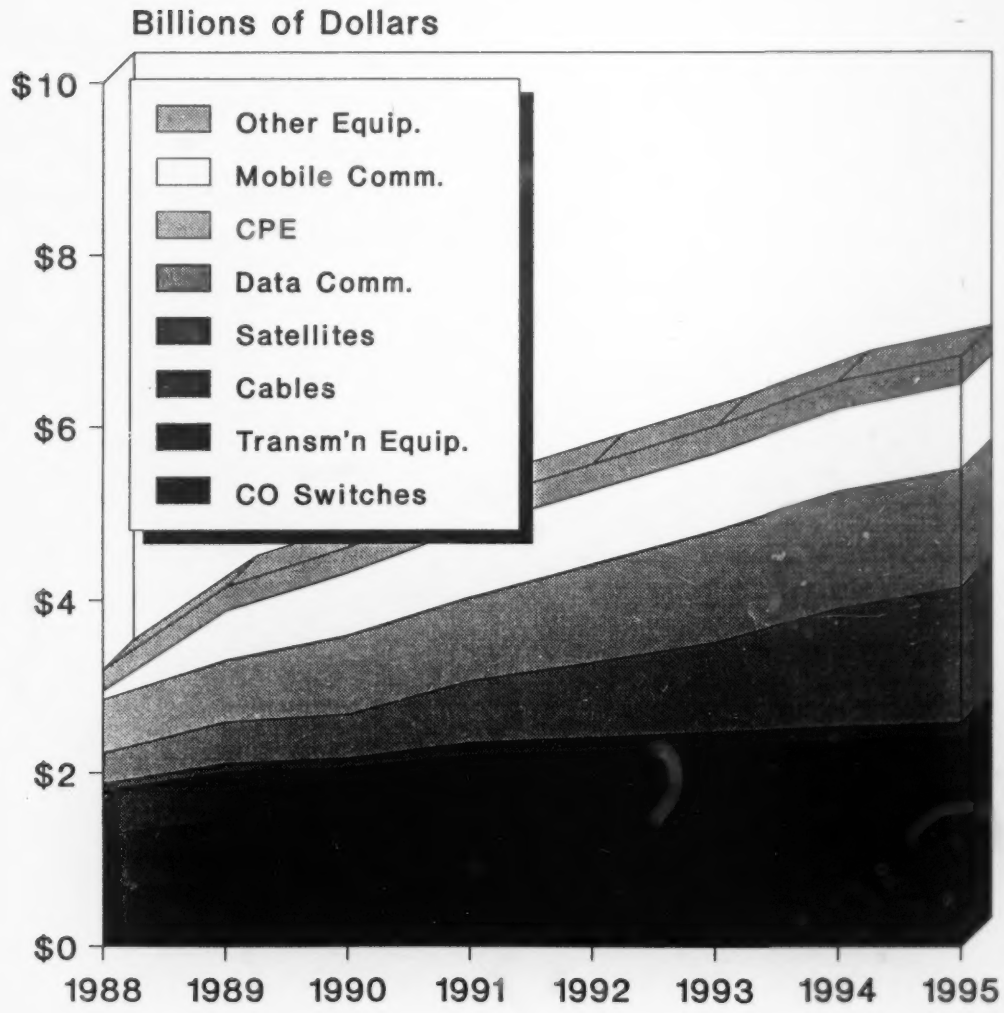
TABLE 23 (Continued)

The Italian Telecommunications Equipment Marketplace, 1988-1995

ITALY	1992	1993	1994	1995
Central Office Switches: $ millions	$ 717.5	$ 722.4	$ 737.5	$ 755.4
Transmission Equipment: $ millions	910.6	960.5	995.3	1,015.4
Cables: $ millions	621.3	625.4	642.8	654.3
Satellites: $ millions	152.6	161.4	155.3	159.7
Data Communications Equipment: $ millions	875.4	1,041.3	1,371.5	1,565.9
PBX:				
Total value: $ millions	355.6	410.5	440.6	495.7
Total lines sold annually (000 lines)	607.9	690.0	740.5	840.2
Total installed lines (000 lines)	4,052.7	4,600.0	4,936.7	5,601.3
Key Systems:				
Total value: $ millions	71.0	78.1	79.0	82.3
Total lines sold annually (000 lines)	295.9	325.4	332.1	350.7
Total installed lines (000 lines)	2,114.0	2,324.3	2,372.1	2,505.0
Facsimile Equipment: $ millions	220.4	250.5	261.3	270.9
Other CPE: $ millions	490.6	550.7	575.9	601.2
Mobile Communications:				
Total value: $ millions	855.4	900.5	955.4	990.3
Cellular market: $ millions	702.6	799.5	835.5	898.0
Cellular subscribers (000)	353.5	420.8	450.2	497.2
Other Equipment	300.6	310.5	317.8	325.6
Total $:	$ 5,571.0	$ 6,012.0	$ 6,532.4	$ 6,917.0

FIGURE 11

Italian Market for Telecommunications Equipment 1988 - 1995



LUXEMBOURG

BACKGROUND

Luxembourg, one of the original members of the European Community, is the smallest EC member, situated between France, Belgium, and Germany. Belgium, Luxembourg, and the Netherlands formed a customs union in 1947. Luxembourg has an area of 999 square miles. The population of Luxembourg is about 375,000. There are some 140,000 households. Estimated 1989 GNP amounted to about $8.3 billion. The government is a constitutional monarchy with one legislative body. The head of the government is the Prime Minister. The capital of Luxembourg is the city of Luxembourg. The European Parliament's Secretariate is located in Luxembourg, as is the EC Court of Justice.

The controlling authority of telecommunications in Luxembourg is the Ministry of Finance. There is currently no separation between regulation and the provision of network services, both of which are carried out by the network operator, Administration des Postes et Telecommunications (P&T). For administrative and operational purposes, the P&T has seven regional divisions, each concentrating on a main switching node of the network and each controlling up to ten local exchanges.

TELECOMMUNICATIONS POLICY

P&T holds a monopoly on all telecommunications services, except value-added services. Competition is now permitted in the terminal equipment market, with the last vestiges of

monopoly control ending in July 1990, when the P&T gave up control over the customer's first phone and radio pagers. Type approval is needed for attachment, but the P&T generally accepts, without further test, approvals gained in other EC countries. Since there is an economic union with Belgium and the Netherlands, Luxembourg tends to follow their leads on policies and equipment implementation in order to ensure network compatibility. In addition, the P&T operates a very liberal purchasing policy.

TELECOMMUNICATIONS INFRASTRUCTURE

Users generally praise the telecommunications infrastructure in Luxembourg, including the level of service and cooperation from the P&T. The fact that it is in an economic union with Belgium and Netherlands assures that Luxembourg's telecommunications development is as progressive as in those countries. In addition, Luxembourg is one of the main commercial and financial crossroads in Europe and has a banking density comparable to London. Furthermore, being a small country juxtaposed between France and Germany, two of the most technologically advanced of the EC members, has also stimulated Luxembourg to keep pace with technological and regulatory advances. For instance, the harmonized digital cellular network in operation in France and Germany must also function in Luxembourg.

There were almost 250,000 telephones in use in Luxembourg in 1989. Roughly two thirds of the population has access to telephone service. The total number of access lines in Luxembourg grew from 154,200 in 1985 to an estimated 172,400 in 1989, the bulk of which are for residential use.

The P&T's earnings from telecommunications services rose dramatically from $66.8 million in 1985 to $144.4 million in 1989. The bulk of the revenue, more than 90 percent, is generated from basic telephone service.

TELECOMMUNICATIONS MARKET

The total market for telecommunications equipment in Luxembourg is projected to grow rapidly from $25.1 million in 1988 to $34.7 million by 1992, before decelerating somewhat to $40.6 million by 1995. The biggest growth potential will be for mobile communications equipment, expected to grow from $5.1 million in 1988 to $8.0 million by 1995. This expansion will occur as digital cellular becomes pervasive and system capacity is increased while subscription costs decrease, thereby stimulating demand.

Other growth segments include fax terminals, central office switches, and transmission equipment. The market for fax terminals is expected to more than double from $2.0 million in 1988 to an estimated $4.5 million by 1995. Expenditures on central office switches should increase from $5.0 million in 1988 to $6.9 million by 1995. Transmission equipment should experience even more rapid growth from $3.0 million in 1988 to $4.5 million by 1995.

Given that Luxembourg has virtually no indigenous telecommunications manufacturing capacity, the country relies on foreign-produced equipment. This may make it easier for foreign producers to penetrate the Luxembourg market.

There are constraints, however. One of which is the size of the opportunity itself. Luxembourg is hardly a burgeoning marketplace. In addition, for many of the product categories, there are traditional supplier relationships that must be overcome. For instance, Siemens is the traditional supplier of central office switches to the P&T. Despite these constraints, there are niche markets that might be very attractive to producers willing to explore the opportunities.

TABLE 24

Luxembourg's Telecommunications Infrastructure, 1985-1990

LUXEMBOURG	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	*220.3	*223.6	*231.0
Total access lines (000)	154.2	156.5	161.7
Residential lines (000)	123.2	124.1	129.4
Business lines (000)	31.0	32.4	32.3
Total network access line capacity (000)	178.3	*179.4	180.0
New applications for service (000)	11.4	*12.0	13.1
Total demand for service (includes moves and changes)	15.0	*25.1	30.1
Waiting list for new service (000)	2.0	*2.6	3.3
Pay telephones in service (000)	.5	.6	.6
Total national traffic (in millions of calls)	N/A	N/A	N/A
Total local traffic (in millions of calls)	N/A	N/A	N/A
Total toll traffic (in millions of calls)	N/A	N/A	N/A
Total outgoing international traffic (in millions of calls)	81.1	*95.4	101.2
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	0.1	*0.2	0.3
Number of private leased lines (000)	0.4	*6.0	12.0
Number of data CPE attached to dedicated public data networks (000)	0.2	*0.2	0.3
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 61,509.1	$ *75,015.4	$ 100,087.3
Income from other telecom services ($000)	5,332.0	*7,925.6	9,725.0
Total income from telecom services ($000)	66,841.1	*82,941.0	109,812.3
Total expenses for providing telecom services ($000)	30,880.0	*50,051.4	*69,722.4
Net income ($000)	35,961.1	*32,889.6	*40,089.9
Annual investment in the network ($000)	12,280.0	*19,250.1	*25,454.4
Annual investment for switching equipment ($000)	5,382.0	*6,851.4	*8,573.4
Ratios:			
Telephone access lines per 100 inhabitants	42.1	*43.1	44.0
Telephone penetration per 100 inhabitants	N/A	N/A	N/A
Telecommunications investment as a share of gross domestic product	3.0	*3.5	4.1
Telecommunications investment as a share of gross fixed-capital formation	16.1	*20.4	30.1

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 24 (Continued)

Luxembourg's Telecommunications Infrastructure, 1985-1990

LUXEMBOURG	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	*240.0	248.9	255.6
Total access lines (000)	168.0	172.4	175.7
Residential lines (000)	134.4	137.6	140.4
Business lines (000)	33.6	34.8	35.3
Total network access line capacity (000)	182.0	184.1	185.4
New applications for service (000)	15.5	16.4	17.4
Total demand for service (includes moves and changes)	33.0	35.0	37.2
Waiting list for new service (000)	4.3	4.8	4.8
Pay telephones in service (000)	.6	.6	.6
Total national traffic (in millions of calls)	N/A	N/A	N/A
Total local traffic (in millions of calls)	N/A	N/A	N/A
Total toll traffic (in millions of calls)	N/A	N/A	N/A
Total outgoing international traffic (in millions of calls)	114.0	121.8	125.9
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	0.3	0.3	0.4
Number of private leased lines (000)	14.1	14.7	15.5
Number of data CPE attached to the dedicated public data networks (000)	0.3	0.4	0.4
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 122,572.1	$ 135,222.4	$ 139,224.6
Income from other telecom services ($000)	9,046.2	9,156.4	9,577.4
Total income from telecom services ($000)	131,618.3	144,378.8	148,802.0
Total expenses for providing telecom services ($000)	72,859.1	75,001.2	79,011.4
Net income ($000)	58,759.2	69,377.3	69,790.6
Annual investment in the network ($000)	33,208.1	35,774.4	36,445.5
Annual investment for switching equipment ($000)	10,718.0	11,220.0	12,565.4
Ratios:			
Telephone access lines per 100 inhabitants	45.4	46.5	47.4
Telephone penetration per 100 inhabitants	N/A	N/A	N/A
Telecommunications investment as a share of gross domestic product	4.5	5.1	5.2
Telecommunications investment as a share of gross fixed-capital formation	35.4	36.9	37.4

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 25

Luxembourg's Telecommunications Equipment Market, 1988-1995

LUXEMBOURG	1988	1989	1990	1991
Central Office Switches: $ millions	$ 5.0	$ 5.0	$ 5.1	$ 5.5
Transmission Equipment: $ millions	3.0	3.1	3.3	3.5
Cables: $ millions	1.2	1.2	1.0	1.3
Satellites: $ millions	.4	.4	.8	.9
Data Communications Equipment: $ millions	1.0	.9	1.1	1.2
PBX:				
Total value: $ millions	2.5	2.7	2.7	2.9
Total lines sold annually (000 lines)	4.2	4.5	4.5	4.8
Total installed lines (000 lines)	27.8	30.1	30.3	32.2
Key Systems:				
Total value: $ millions	.4	.4	.4	.4
Total lines sold annually (000 lines)	1.5	1.6	1.6	1.7
Total installed lines (000 lines)	10.3	10.5	10.7	10.8
Facsimile Equipment: $ millions	2.0	2.3	2.9	3.3
Other CPE: $ millions	2.5	2.8	2.9	3.1
Mobile Communications:				
Total value: $ millions	5.1	5.5	7.0	7.1
Cellular market: $ millions	4.9	5.1	6.0	6.9
Cellular subscribers (000)	.2	.4	.6	.7
Other Equipment	2.0	2.1	2.0	3.0
Total: $ millions	$ 25.1	$ 26.4	$ 29.2	$ 32.2

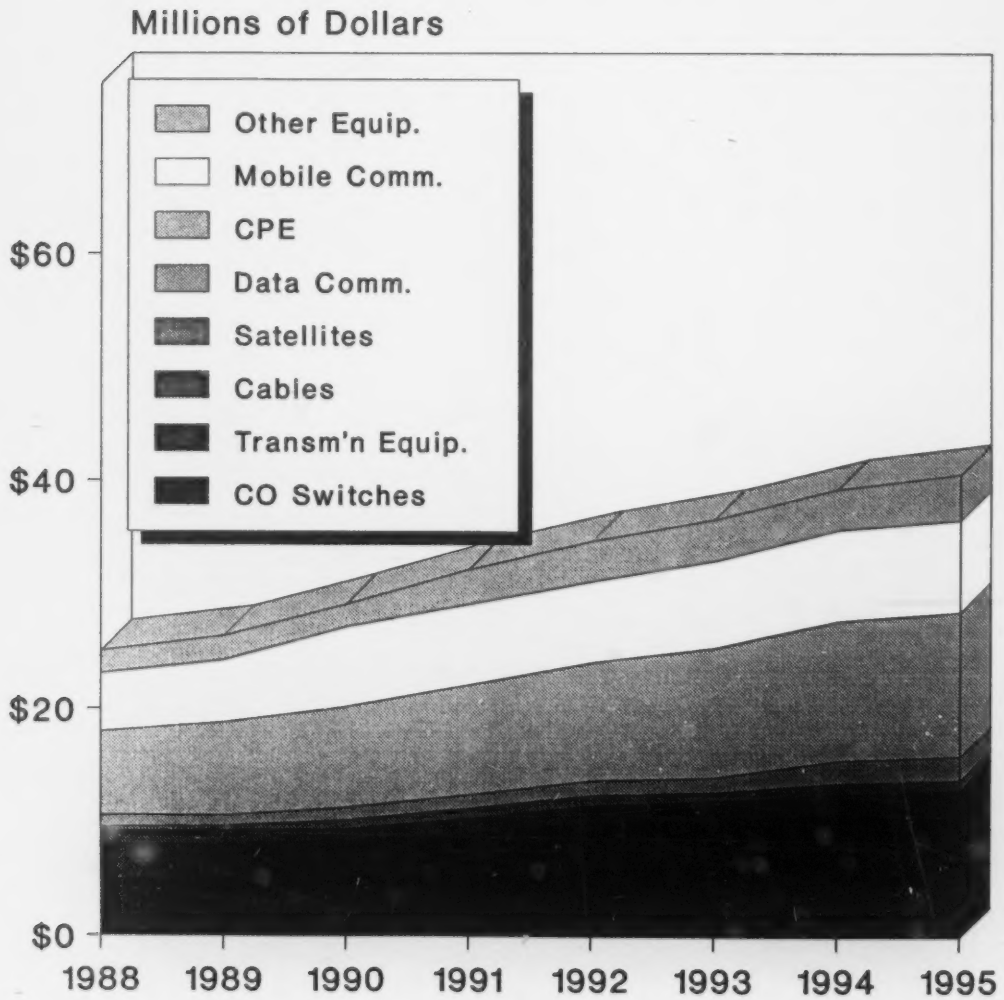
TABLE 25 (Continued)

Luxembourg's Telecommunications Equipment Market, 1988-1995

LUXEMBOURG	1992	1993	1994	1995
Central Office Switches: $ millions	$ 6.0	$ 6.2	$ 6.7	$ 6.9
Transmission Equipment: $ millions	4.0	4.0	4.1	4.5
Cables: $ millions	1.5	1.7	1.7	1.5
Satellites: $ millions	.9	.8	1.0	.9
Data Communications Equipment: $ millions	1.3	1.3	2.0	2.1
PBX:				
Total value: $ millions	3.0	3.0	3.0	3.1
Total lines sold annually (000 lines)	5.0	5.2	5.3	5.4
Total installed lines (000 lines)	33.3	34.7	35.4	35.8
Key Systems:				
Total value: $ millions	.5	.6	.8	.8
Total lines sold annually (000 lines)	1.9	2.2	3.2	3.2
Total installed lines (000 lines)	12.1	14.7	19.3	19.5
Facsimile Equipment: $ millions	4.0	4.3	4.5	4.5
Other CPE: $ millions	2.9	3.5	4.0	4.3
Mobile Communications:				
Total value: $ millions	7.1	7.6	7.9	8.0
Cellular market: $ millions	6.9	7.1	7.4	7.5
Cellular subscribers (000)	.7	.8	1.0	1.1
Other Equipment	3.5	3.6	3.6	4.0
Total: $ millions	$ 35.0	$ 37.0	$ 39.3	$ 41.0

FIGURE 12

Luxembourg's Market for Telecommunications Equipment, 1988 - 1995



THE NETHERLANDS

BACKGROUND

The Netherlands, also known as Holland, is a small country on the North Sea bounded by Belgium to the south and Germany to the east. The Netherlands, one of the original members of the European Community, occupies 14,140 square miles. The population of the Netherlands is approximately 14 million people and 5.5 million households. Estimated 1989 GNP amounted to almost $260 billion. In most reference works, the Netherlands is listed as having two capitals--The Hague and Amsterdam. The Hague is the seat of the goverment, while Amersterdam is the location of the royal residence. The government is a constitutional monarchy with two legislative bodies. The head of the government is the Prime Minister.

Prior to January 1, 1989, the Dutch PTT was a department within the Ministry of Transportation and Public Works. At that time, the network/postal operator function was split from the regulator function. The new company, Royal PTT Nederland NV, is a state-owned, limited liability, corporation. PTT Telecom is the telecommunications branch of the company. The national network is divided into 13 administrative telephone districts, with each district independent from the others in terms of responsibilities for public-related services, installation, and maintenance.

TELECOMMUNICATIONS POLICY

PTT Telecom has a monopoly on basic telephone service within the Netherlands. Competition is permitted in value-added services. While competition in terminal equipment is allowed, there

are several impediments to a truly open marketplace. First, the certification and approvals process is conducted by the Dr. Neher Labs (DNL), which is closely affiliated with Philips, one of the world's largest electronics manufacturers and headquartered in the Netherlands. Users have criticized the relationship between Philips and DNL as being too cozy.

In addition, PTT Telecom has an exclusive distribution contract with Ericsson of Sweden for PBXs and other business CPE. This puts other brands of PBXs at a distinct disadvantage, because they have to sell against the telephone company which has monopoly bottleneck control.

TELECOMMUNICATIONS INFRASTRUCTURE

Users generally give the Dutch telephone system high marks for sophistication, service, reliability, and cost. This has been especially true since January 1989, when the PTT was converted from a state agency to a state corporation.

Forming part of the economic union with Luxembourg and Belgium, frequently called the Benelux group, the Netherlands and its neighbors see themselves as an important subgroup within the EC and as pace setters for EC integration. To this end, they work closely with each other to coordinate telecommunications policy to ensure technical and regulatory conformity. Notwithstanding, there are differences between the PTTs in the three countries, with the Dutch PTT being perhaps the most progressive of the three.

Areas of particular concern for PTT Telecom include digitization of the infrastructure, mobile communications, and data communications. By the year 2000, the telecommunications infrastructure will be almost entirely digital, and public broadband data will be provided via a specialized network.

In 1989 there were approximately 10 million telephones in use in the Netherlands attached to 6.6 million access lines. Approximately 67 percent of all Dutch citizens had telephone service that year. Total national traffic during in 1989 amounted to about 6.6 billion calls, of which 3.4 billion were local, and the balance toll. The public data network has grown considerably over the past several years from 1,400 data CPE in 1985 to 9,800 by 1989. PTT income from telecommunications services more than doubled from $2.1 billion in 1985 to $4.6 billion by 1989.

TELECOMMUNICATIONS MARKET

The total market for telecommunications equipment in the Netherlands is expected to rise from $845.1 million in 1988 to $1.2 billion by 1992 and to $1.4 billion by 1995. Major areas of growth will be in transmission equipment, due to expand from $185.6 million in 1988 to $315.9 million in 1995; data communications equipment, rising from $49.7 million in 1988 to $107.5 million in 1995; mobile communications equipment, expected to climb from $50.5 million in 1988 to $159.6 million by 1995; and central office switches, growing from $290.6 million in 1988 to $425.6 million by 1995.

Given the aggressive way the government has pursued liberalization, it is likely that the Netherlands will develop into an attractive market for foreign suppliers. Obstacles to overcome include restrictive distribution arrangements and certification procedures, and established supplier relationships. Aggressive marketing to business users, who are putting pressure on the Dutch government demanding increased choice, is likely to be an effective means of penetrating the Dutch marketplace.

TABLE 26

The Dutch Telecommunications Infrastructure, 1985-1990

NETHERLANDS	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	*8,785.0	*9,080.0	*9,410.0
Total access lines (000)	5,823.0	6,029.0	6,234.0
Residential lines (000)	4,600.2	4,703.0	4,863.0
Business lines (000)	1,223.0	2,203.0	1,371.0
Total network access line capacity (000)	6,751.0	6,874.0	7,023.0
New applications for service (000)	346.0	368.0	380.0
Total demand for service (includes moves and changes)	712.0	756.0	774.0
Waiting list for new service (000)	55.0	51.0	54.0
Pay telephones in service (000)	6.5	6.6	6.6
Total national traffic (in millions of calls)	5,880.0	6,056.0	6,242.1
Total local traffic (in millions of calls)	3,242.0	3,315.0	3,360.0
Total toll traffic (in millions of calls)	2,638.0	2,741.0	2,882.1
Total outgoing international traffic (in millions of calls)	127.0	140.0	159.0
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	12.0	14.1	16.1
Number of data CPE attached to dedicated public data networks (000)	1.4	3.1	5.1
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 1,893,323.1	$ 2,882,364.0	$*3,024,333.4
Income from other telecom services ($000)	164,741.9	259,909.0	424,428.6
Total income from telecom services ($000)	2,058,065.0	3,142,273.0	3,448,762.0
Total expenses for providing telecom services ($000)	1,788,355.0	2,627,136.4	2,860,000.0
Net income ($000)	269,710.0	515,136.4	588,762.0
Annual investment in the network ($000)	503,226.0	661,818.2	702,543.1
Annual investment for switching equipment ($000)	165,806.5	315,454.5	337,221.0
Ratios:			
Telephone access lines per 100 inhabitants	40.1	41.3	42.4
Telephone penetration per 100 inhabitants	60.5	62.1	64.1
Telecommunications investment as a share of gross domestic product	4.2	4.1	4.1
Telecommunications investment as a share of gross fixed-capital formation	20.5	18.1	18.1

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 26 (Continued)

The Dutch Telecommunications Infrastructure, 1985-1990

NETHERLANDS	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	*9,750.0	9,977.0	1,105.4
Total access lines (000)	6,466.0	6,577.4	6,851.8
Residential lines (000)	4,914.2	5,010.2	5,115.7
Business lines (000)	1,552.0	1,567.2	1,736.1
Total network access line capacity (000)	7,298.0	7,454.3	7,555.9
New applications for service (000)	400.0	420.1	475.1
Total demand for service (includes moves and changes)	795.0	850.2	895.4
Waiting list for new service (000)	38.0	40.2	41.5
Pay telephones in service (000)	6.7	6.7	6.8
Total national traffic (in millions of calls)	6,423.8	6,564.4	6,800.7
Total local traffic (in millions of calls)	3,393.8	3,432.2	3,554.9
Total toll traffic (in millions of calls)	3,030.0	3,132.2	3,245.8
Total outgoing international traffic (in millions of calls)	186.0	195.4	201.4
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	17.4	18.8	19.9
Number of data CPE attached to the dedicated public data networks (000)	8.3	9.8	10.1
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$*3,324,555.1	$ 3,895,641.1	$ 4,001,225.1
Income from other telecom services ($000)	576,444.9	654,371.5	697,524.3
Total income from telecom services ($000)	3,901,000.0	4,550,012.6	4,698,749.4
Total expenses for providing telecom services ($000)	3,315,550.0	3,960,552.5	4,020,101.1
Net income ($000)	585,450.0	589,460.1	678,648.3
Annual investment in the network ($000)	795,445.1	845,444.1	895,431.2
Annual investment for switching equipment ($000)	381,813.6	405,813.2	445,301.0
Ratios:			
Telephone access lines per 100 inhabitants	44.1	47.5	49.9
Telephone penetration per 100 inhabitants	66.1	67.2	69.2
Telecommunications investment as a share of gross domestic product	5.1	5.1	5.8
Telecommunications investment as a share of gross fixed-capital formation	20.2	25.4	25.7

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 27

The Dutch Telecommunications Equipment Marketplace, 1988-1995

NETHERLANDS	1988	1989	1990	1991
Central Office Switches: $ millions	$ 290.6	$ 285.2	$ 292.6	$ 395.7
Transmission Equipment: $ millions	185.6	187.5	192.5	235.6
Cables: $ millions	90.3	95.7	98.9	104.6
Satellites: $ millions	11.4	12.5	15.4	17.6
Data Communications Equipment: $ millions	49.7	53.5	70.7	72.5
PBX:				
Total value: $ millions	60.5	62.0	61.6	63.4
Total lines sold annually (000 lines)	100.8	103.3	105.5	105.6
Total installed lines (000 lines)	672.2	688.9	690.1	700.5
Key Systems:				
Total value: $ millions	15.0	15.2	15.0	15.8
Total lines sold annually (000 lines)	60.7	60.8	61.2	64.2
Total installed lines (000 lines)	404.7	405.3	408.2	428.1
Facsimile Equipment: $ millions	45.3	50.6	56.7	58.5
Other CPE: $ millions	30.5	32.6	35.4	38.6
Mobile Communications:				
Total value: $ millions	50.5	90.4	100.9	115.4
Cellular market: $ millions	45.4	85.6	90.3	105.3
Cellular subscribers (000)	23.8	53.0	60.2	70.3
Other Equipment	15.7	21.8	25.7	30.6
Total: $ millions	$ 845.1	$ 907.0	$ 965.4	$ 1,148.3

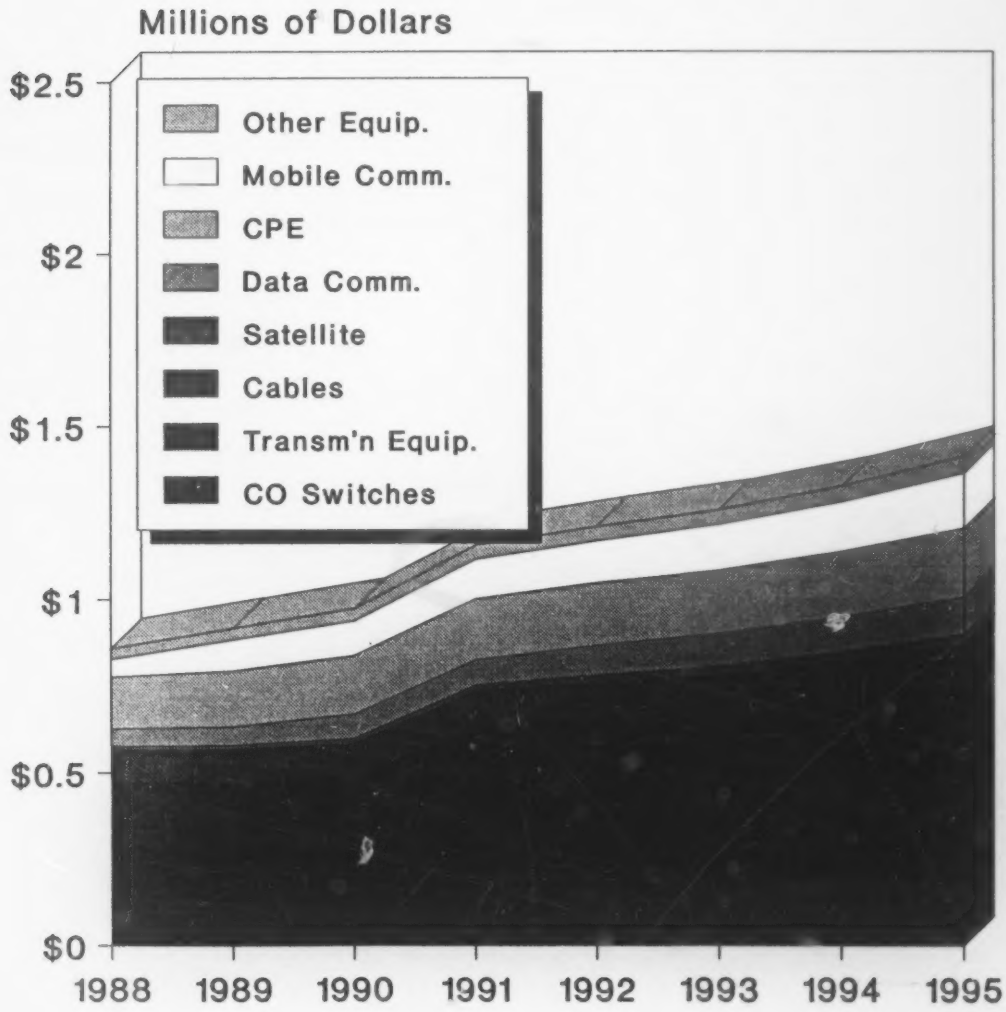
TABLE 27 (Continued)

The Dutch Telecommunications Equipment Marketplace, 1988-1995

NETHERLANDS	1992	1993	1994	1995
Central Office Switches: $ millions	$ 415.3	$ 407.4	$ 409.7	$ 425.6
Transmission Equipment: $ millions	241.7	258.9	290.7	315.9
Cables: $ millions	105.4	115.9	122.3	130.7
Satellites: $ millions	20.5	25.7	27.6	28.9
Data Communications Equipment: $ millions	85.6	93.4	99.7	107.5
PBX:				
Total value: $ millions	63.8	64.3	64.9	66.2
Total lines sold annually (000 lines)	106.3	108.1	109.1	111.1
Total installed lines (000 lines)	708.9	715.0	725.6	735.6
Key Systems:				
Total value: $ millions	16.2	16.9	17.1	17.2
Total lines sold annually (000 lines)	65.6	68.1	69.8	70.2
Total installed lines (000 lines)	437.2	454.0	465.3	468.0
Facsimile Equipment: $ millions	59.2	60.4	61.5	65.4
Other CPE: $ millions	40.5	41.2	44.8	48.7
Mobile Communications:				
Total value: $ millions	122.5	133.6	145.0	159.6
Cellular market: $ millions	110.6	122.5	130.6	145.2
Cellular subscribers (000)	73.7	81.7	87.1	97.1
Other Equipment	31.8	38.7	45.2	50.1
Total: $ millions	$ 1,203.0	$ 1,256.4	$ 1,329.0	$ 1,416.0

FIGURE 13

Dutch Market for Telecommunications Equipment 1988 - 1995



PORTUGAL

BACKGROUND

Portugal is a relatively small country on the Iberian Peninsula occupying some 35,383 square miles. Its population is estimated at 10.4 million people and 3.3 million households. Estimated 1989 GNP amounted to some $45 billion. The capital of Portugal is Lisbon. The government is a parliamentary state with one legislative house. The head of the government is the Prime Minister. Portugal joined the EC in 1986 along with Spain. They were the last two countries to join the European Community.

Overall responsibility for telecommunications in Portugal is delegated to the General Board of the PTT, whose members are selected by the Portuguese government. The PTT has two operating bodies subordinate to the General Board. They are Telephonos de Lisboa e Oporto (TLP), responsible for telephone service in Lisbon and Oporto, and Correios e Telecommunicacoes de Portugal (CTT), responsible for the rest of the national telephone network and international services. Companhia Portuguesa Radio Marconi (CPRM), a private company, supplies international satellite and cable telephone services as well as national links with the Madeira and the Azores islands. Although CPRM is ostensibly private, a nationalized bank holds the majority of shares and the government appoints the management board.

TELECOMMUNICATIONS POLICY

TLP and CTT have monopoly control over the national telecommunications network. CPRM and CTT compete to a limited degree for international services. With the exception of the customer's first telephone which must be provided by the local carrier, terminal equipment is available competitively.

For their own distribution, the carriers buy telex terminals, telephone instruments, and PBXs from established Portuguese suppliers, although foreign suppliers are legally able to sell directly to customers. Due to limited local suppliers, the carriers buy some central office equipment, transmission equipment, and data communications equipment from foreign suppliers.

TELECOMMUNICATIONS INFRASTRUCTURE

Portugal has one of the most antiquated telephone networks in Europe. Users claim that almost 63 percent of international data calls from Portugal failed. During peak hours, users usually get a busy signal after dialing only two of the numbers. On most days, dialing into the packet switced network takes up to four attempts. Once connected, calls are often interrupted by interference on the line during peak hours. The voice network is equally abysmal.

Portugal has tried several times to revitalize their network, but each attempt has fallen considerably short. The present government has brought some encouragement by putting forth

a very ambitious $1.5 billion, ten-year plan to expand and modernize the network, with emphasis on mobile communications and ISDN. With rural service barely existing, the carriers plan to install some 310,000 digital and analog lines in rural areas by the end of this year.

Portugal has some 2.4 million telephones in use attached to 2.1 million access lines. The telephone penetration rate in Portugal is one of the lowest in Europe. Only 26 percent of Portuguese citizens have access to telephone service. The PTT hopes to increase the number of phones in service to 4.4 million by the year 2000 and increase penetration to 50 percent.

The positive side of the picture is that Portugal's telephone network can only get better. As a major recipient of the EC's STAR program, the infrastructure is likely to jump over several evolutionary steps in network development right into digital technology. This could allow Portugal to play catch-up at a rather rapid pace and also provide opportunities for indigenous and foreign suppliers.

TELECOMMUNICATIONS MARKET

The total market for telecommunications equipment in Portugal is expected to grow from $158.3 million in 1988 to $323.0 million by 1992 and $493.7 million by 1995. Given the state of the network, and the goals that must be achieved through EC directives, the market will have to grow rapidly over the next several years.

All segments will experience rapid expansion. The largest market is for central office switches. Rapid changeout of crossbar to digital technology will stimulate the central office switch market to grow from $45.6 million in 1988 to $75.9 million in 1992 and to $90.5 million in 1995. Likewise, the market for transmission equipment will more than double from $35.3 million in 1988 to $79.8 million by 1995. The market for mobile communications will soar from $10.5 million in 1988 to $68.8 million by 1995. Most other markets will also show dramatic growth.

The prospects for foreign suppliers is quite good. Portugal does not have an extensive domestic industry to foster. In addition, traditional supplier relationships with various foreign suppliers do not seem to be that strong. One limiting factor is the size of the market, which may not be large enough to attract some suppliers. For those that do pursue the market, there is likely to be some unevenness on how rapidly the market develops, but in general there appears to be some good growth potential for suppliers willing to invest the time.

As in some of the other lesser developed members of the EC, investment in production facilities in Portugal may be a good strategy. Portugal can be used as a springboard for sales to the rest of Europe. The wage rate is relatively low compared to other parts of Europe. And, of course, immediate access to the Portugese market can be achieved.

TABLE 28

The Portuguese Telecommunications Infrastructure, 1985-1990

PORTUGAL	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	1,825.3	1,936.4	2,072.0
Total access lines (000)	1,400.4	1,511.1	1,656.3
Residential lines (000)	1,022.3	1,103.1	1,226.1
Business lines (000)	378.1	408.0	430.2
Total network access line capacity (000)	1,707.1	1,828.0	1,947.3
New applications for service (000)	120.1	188.1	264.4
Total demand for service (includes moves and changes)	N/A	N/A	N/A
Waiting list for new service (000)	49.2	82.1	140.1
Pay telephones in service (000)	19.5	19.5	19.6
Total national traffic (in millions of calls)	N/A	N/A	N/A
Total local traffic (in millions of calls)	N/A	N/A	N/A
Total toll traffic (in millions of calls)			
Total outgoing international traffic (in millions of calls)	N/A	N/A	N/A
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	1.1	N/A
Number of private leased lines (000)	4.0	6.0	7.0
Number of data CPE attached to dedicated public data networks (000)	.1	.5	1.0
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 483,441.3	$ 587,899.1	$ 746,802.5
Income from other telecom services ($000)	223,940.3	285,120.5	162,460.0
Total income from telecom services ($000)	707,381.6	873,019.6	909,262.1
Total expenses for providing telecom services ($000)	551,423.1	715,554.0	695,780.2
Net income ($000)	155,958.3	157,465.6	213,481.9
Annual investment in the network ($000)	176,109.1	208,564.7	273,330.0
Annual investment for switching equipment ($000)	51,336.1	40,180.7	64,220.0
Ratios:			
Telephone access lines per 100 inhabitants	14.1	15.0	16.0
Telephone penetration per 100 inhabitants	18.0	19.0	20.1
Telecommunications investment as a share of gross domestic product	8.4	7.4	7.2
Telecommunications investment as a share of gross fixed-capital formation	39.0	33.1	29.1

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 28 (Continued)

The Portuguese Telecommunications Infrastructure, 1985-1990

PORTUGAL	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	2,258.3	2,385.5	2,550.2
Total access lines (000)	1,849.2	2,059.5	2,410.4
Residential lines (000)	1,368.4	1,455.4	1,650.4
Business lines (000)	480.8	604.1	760.0
Total network access line capacity (000)	2,111.0	2,355.4	2,550.1
New applications for service (000)	283.0	289.0	299.4
Total demand for service (includes moves and changes)	N/A	N/A	N/A
Waiting list for new service (000)	178.3	185.4	185.1
Pay telephones in service (000)	20.9	21.1	21.1
Total national traffic (in millions of calls)	N/A	N/A	N/A
Total local traffic (in millions of calls)	N/A	N/A	N/A
Total toll traffic (in millions of calls)	N/A	N/A	N/A
Total outgoing international traffic (in millions of calls)	N/A	N/A	N/A
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	8.4	8.9	9.2
Number of data CPE attached to the dedicated public data networks (000)	2.6	3.5	3.9
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 784,195.1	$ 800,511.4	$ 810,510.4
Income from other telecom services ($000)	238,890.0	244,512.5	245,332.4
Total income from telecom services ($000)	1,023,085.1	1,045,023.5	1,055,842.8
Total expenses for providing telecom services ($000)	725,999.3	735,555.0	740,120.5
Net income ($000)	297,085.8	309,468.5	315,722.3
Annual investment in the network ($000)	404,668.5	445,667.5	460,120.9
Annual investment for switching equipment ($000)	121,837.4	155,766.4	157,222.7
Ratios:			
Telephone access lines per 100 inhabitants	18.0	20.1	21.2
Telephone penetration per 100 inhabitants	22.0	25.6	26.5
Telecommunications investment as a share of gross domestic product	10.5	12.2	13.5
Telecommunications investment as a share of gross fixed-capital formation	37.4	44.2	48.9

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 29

The Portuguese Telecommunications Marketplace, 1988-1995

PORTUGAL	1988	1989	1990	1991
Central Office Switches: $ millions	$ 45.6	$ 50.5	$ 53.7	$ 64.5
Transmission Equipment: $ millions	35.3	41.6	50.4	51.3
Cables: $ millions	13.2	13.8	15.0	17.2
Satellites: $ millions	3.2	4.5	5.7	7.6
Data Communications Equipment: $ millions	9.4	12.7	15.4	20.0
PBX:				
Total value: $ millions	10.2	13.7	15.6	18.2
Total lines sold annually (000 lines)	16.7	22.5	25.8	30.0
Total installed lines (000 lines)	128.6	172.6	198.3	231.4
Key Systems:				
Total value: $ millions	2.4	2.9	3.4	4.0
Total lines sold annually (000 lines)	9.2	11.2	13.3	16.0
Total installed lines (000 lines)	71.0	85.8	103.5	119.4
Facsimile Equipment: $ millions	8.4	9.6	15.7	19.7
Other CPE: $ millions	10.4	13.7	18.6	22.4
Mobile Communications:				
Total value: $ millions	10.5	18.4	25.6	29.4
Cellular market: $ millions	-0-	9.0	16.5	21.4
Cellular subscribers (000)	-0-	2.8	6.6	9.3
Other Equipment	9.7	15.6	20.5	23.7
Total: $ millions	$ 158.3	$ 197.0	$ 239.6	$ 278.0

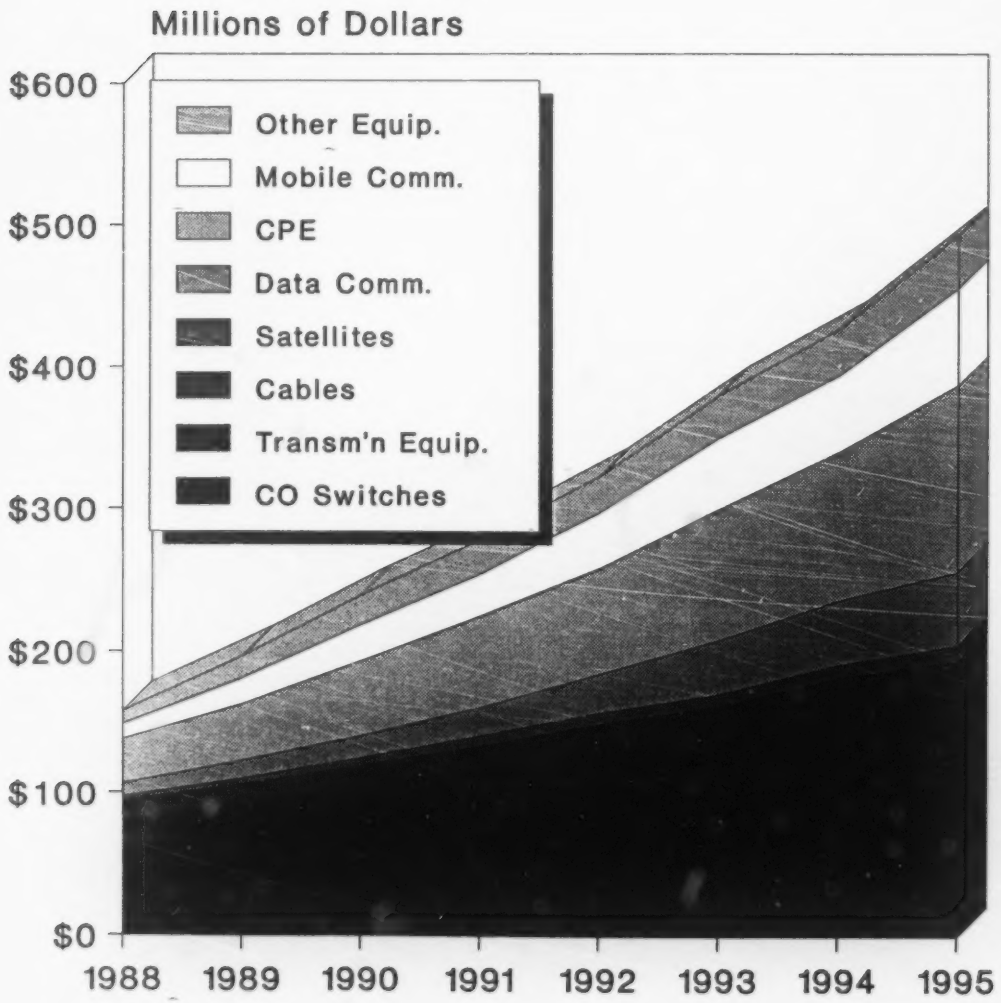
TABLE 29 (Continued)

The Portuguese Telecommunications Marketplace, 1988-1995

PORTUGAL	1992	1993	1994	1995
Central Office Switches: $ millions	$ 75.9	$ 79.8	$ 86.4	$ 90.5
Transmission Equipment: $ millions	55.7	62.9	74.6	79.8
Cables: $ millions	17.4	18.9	20.8	23.7
Satellites: $ millions	7.9	8.7	9.4	10.7
Data Communications Equipment: $ millions	27.6	37.9	44.7	50.9
PBX:				
Total value: $ millions	19.0	21.6	22.2	25.7
Total lines sold annually (000 lines)	31.7	36.0	37.0	43.1
Total installed lines (000 lines)	238.7	257.1	264.3	285.6
Key Systems:				
Total value: $ millions	4.2	4.4	5.0	5.7
Total lines sold annually (000 lines)	16.9	17.9	20.8	23.8
Total installed lines (000 lines)	130.0	135.6	141.6	158.3
Facsimile Equipment: $ millions	25.6	37.9	45.5	60.7
Other CPE: $ millions	24.7	27.6	31.5	39.7
Mobile Communications:				
Total value: $ millions	39.5	50.7	54.6	68.8
Cellular market: $ millions	29.7	40.3	45.7	59.4
Cellular subscribers (000)	12.9	22.4	26.9	39.6
Other Equipment	25.5	30.1	32.6	37.5
Total: $ millions	$ 323.0	$ 381.0	$ 427.3	$ 493.7

FIGURE 14

Portugese Market for Telecommunications Equipment 1988 - 1995



SPAIN

BACKGROUND

Spain is the largest country in the European Community, occupying nearly 195,000 square miles. The total population of Spain is estimated at close to 40 million people and more than 11 million households. In 1989, Spain had an estimated GNP of $420 billion. Spain is a constitutional monarchy with two legislative houses. The capital of Spain is Madrid. The head of the government is the Prime Minister. Spain joined the EC with Portugal in 1986 becoming the 11th and 12th members.

Telecommunications in Spain is under the direction of the Direccion General de Telecommunicaciones (DGT), part of the Ministry of Transport, Tourism, and Communications. The Junta Nacional de Telecomunicaciones (JNT) is an advisory committee responsible for the coordination of telecommunications developments.

The network operator is Telefonica, a private corporation, with 54 percent of its shares privately held, 31 percent owned directly by the government, and 15 percent held by government-owned institutions. Telefonica is organized into six operating groups responsible for various aspects of the carrier's activities.

TELECOMMUNICATIONS POLICY

After years of deliberation, the Spanish legislature approved the Law on Telecommunications in 1987 to reform Spanish telecommunications. The importance of the law lies in the fact that it

regulates the telecommunications sector in Spain for the first time. The law lists several services, including local exchange, long-distance, mobile, videotext, facsimile, and others, that are to remain under monopoly control. AS to other types of services, the law is vague about competition and seems to permit it in certain, but not all, instances. The extent to which the services sector will be liberalized will depend on the regulations to implement the law. To date, these regulations have not been issued.

Spain requires two certificates for attachment of customer premises equipment to the public network: one, issued by the Ministry of Industry, that states that the equipment is not harmful to the user and the second, issued by the Minstry of Transport, Tourism, and Communications, that states that the equipment is not harmful to the network. Spain does not recognize test results from non-EC countries. All imported equipment must go through intricate testing procedures that take up to six months.

Standards are not published, nor is there any formal public process that would allow foreign participation in the standards-setting process. However, the government agencies responsible for standards do consult domestic industry trade associations.

In procurement policies, the Spanish government gives preference to products made in Spain and other EC countries, but does seem willing to work with non-EC countries. AT&T and IBM are notable examples. AT&T, for instance, has recently established strong ties with Telefonica and has become one of the three preferred switch suppliers. As for terminal equipment, Telefonica continues to maintain a monopoly over the customer's first telephone and modems. Competition is permitted for other products.

TELECOMMUNICATIONS INFRASTRUCTURE

Users are generally disatisficd with the Spanish telecommunications infrastructure. The variety of services is limited and their availability is spotty. The quality of the service is inconsistent. Things are changing, however. Spain has embarked on one of the most ambitious network upgrades of the EC and has allocated $10 billion in capital expenditures for network modernization by 1992. Aside from the EC directives mandating change, Spain will be hosting the 1992 Olympics and the 1992 World Trade Fair. These events have inspired a tremendous amount of activity towards upgrading the network.

In 1989 there were approximately 16 million telephones installed in Spain and more than 12 million access lines. Telephone penetration amounted to about 45 out of every 100 Spanish inhabitants. Telephone penetration in rural areas is especially spotty, and is one of the priorities of the development plan. Total national traffic in 1989 amounted to almost 22 billion telephone calls, of which 17 billion were local calls.

Telefonica earned an estimated $6.3 billion in 1989, up from $2.8 billion in 1985. The bulk of the revenue is derived from basic telephone service.

TELECOMMUNICATIONS MARKET

The Spanish telecommuncations markets is likely to experience one of the most rapid growth rates of the EC, especially until 1992. Due to Spain's hosting the Olympics and the Worlds Trade Fair that year, Spain has targetted 1992 as the deadline for many projects. After 1992, the growth

in the market should slow somewhat, but will still provide some good opportunities. The total market for telecommunications equipment in Spain is expected to increase rapidly from $1.7 billion in 1988 to $2.6 billion by 1992, before slowing somewhat to $2.9 billion by 1995.

The bulk of expenditures will be for central office switches, transmission equipment, fax terminals, cables, and data communications equipment. The market for central office switches will increase from $401.3 million in 1988 to $620.3 million in 1992, before declining to about $600 million by 1995. Sales of transmission equipment will grow steadily, rising from $375.6 million in 1988 to $435.6 million by 1995. Expenditures on fax terminals should skyrocket from $174.3 million in 1988 to $475.6 million by 1995. The market for data communication equipment will experience explosive growth from $95.6 million in 1988 to $337.9 million in 1995. Cables will also see dramatic growth from $226.3 million in 1988 to $393.3 million by 1995.

Overall, the Spanish telecommunications equipment market is one that cannot be ignored by any company serious about Europe. There are problems, but the potential rewards are substantial. The Spanish government is especially interested in domestic investment. However, even without substantial local investment, foreign producers (especially those with plants in Europe) should find profitable opportunities in Spain's many niche markets. Likely prospects for foreign suppliers include voice processing, data communications, cellular, paging, and satellite reception equipment.

TABLE 30

The Spanish Telecommunications Infrastructure, 1985-1990

SPAIN	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	14,259.0	14,748.3	15,477.1
Total access lines (000)	9,340.5	9,801.0	10,236.4
Residential lines (000)	7,285.6	7,547.1	7,677.3
Business lines (000)	2,054.9	2,254.1	2,559.1
Total network access line capacity (000)	10,571.3	10,927.3	11,086.0
New applications for service (000)	585.0	774.0	906.3
Total demand for service (includes moves and changes)	668.1	840.5	1,135.4
Waiting list for new service (000)	253.1	293.1	365.5
Pay telephones in service (000)	*54.0	*55.0	55.0
Total national traffic (in millions of calls)	*14,842.1	*15,779.5	16,757.0
Total local traffic (in millions of calls)	*12,022.0	*12,781.4	13,445.4
Total toll traffic (in millions of calls)	2,820.1	2,998.1	3,312.1
Total outgoing international traffic (in millions of calls)	88.1	99.3	117.3
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	10.0	13.1	20.1
Number of private leased lines (000)	41.1	45.0	53.4
Number of data CPE attached to dedicated public data networks (000)	27.1	33.1	34.1
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 2,366,202.2	$ 2,422,000.0	$ 4,415,102.0
Income from other telecom services ($000)	389,231.4	*361,705.0	*456,313.0
Total income from telecom services ($000)	2,755,433.6	2,783,705.0	4,871,415.3
Total expenses for providing telecom services ($000)	2,489,071.0	3,086,750.0	4,391,712.0
Net income ($000)	266,362.6	-303,045.0	479,704.0
Annual investment in the network ($000)	1,171,778.4	1,557,517.4	*2,235,450.1
Annual investment for switching equipment ($000)	242,180.2	268,818.2	318,468.5
Ratios:			
Telephone access lines per 100 inhabitants	24.1	25.2	26.2
Telephone penetration per 100 inhabitants	36.3	38.0	39.6
Telecommunications investment as a share of gross domestic product	7.3	7.1	6.1
Telecommunications investment as a share of gross fixed-capital formation	33.1	31.4	25.2

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 30 (Continued)

The Spanish Telecommunications Infrastructure, 1985-1990

SPAIN	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	*15,995.0	16,025.1	17,542.1
Total access lines (000)	11,233.1	12,492.5	12,807.2
Residential lines (000)	8,060.0	8,755.5	8,954.1
Business lines (000)	3,173.1	3,737.0	3,853.1
Total network access line capacity (000)	11,781.0	11,995.4	12,511.1
New applications for service (000)	1,356.4	1,875.4	1,954.4
Total demand for service (includes moves and changes)	1,441.0	2,051.5	2,201.8
Waiting list for new service (000)	578.1	602.1	609.7
Pay telephones in service (000)	56.0	56.5	57.0
Total national traffic (in millions of calls)	*19,725.1	*21,554.1	25,933.3
Total local traffic (in millions of calls)	*16,059.9	*17,021.0	19,955.6
Total toll traffic (in millions of calls)	3,665.2	4,533.1	5,977.7
Total outgoing international traffic (in millions of calls)	135.1	145.1	162.2
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	167.4	375.5	402.2
Number of private leased lines (000)	58.3	72.4	91.5
Number of data CPE attached to the dedicated public data networks (000)	57.0	70.3	87.4
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 4,859,468.0	$ 5,125,000.0	$ 5,959,612.4
Income from other telecom services ($000)	1,116,723.7	1,215,500.0	1,350,420.1
Total income from telecom services ($000)	5,976,191.7	6,340,500.0	7,310,032.5
Total expenses for providing telecom services ($000)	4,954,502.1	5,256,500.0	5,945,751.1
Net income ($000)	1,021,689.6	1,084,000.0	1,364,281.4
Annual investment in the network ($000)	2,889,036.1	3,051,225.0	4,555,731.2
Annual investment for switching equipment ($000)	642,791.2	725,600.5	800,573.1
Ratios:			
Telephone access lines per 100 inhabitants	28.2	33.5	35.1
Telephone penetration per 100 inhabitants	*40.4	44.6	49.5
Telecommunications investment as a share of gross domestic product	8.1	9.3	10.2
Telecommunications investment as a share of gross fixed-capital formation	40.0	41.7	44.1

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 31

The Spanish Telecommunications Equipment Marketplace, 1988-1995

SPAIN	1988	1989	1990	1991
Central Office Switches: $ millions	$ 401.3	$ 400.6	$ 550.8	$ 590.4
Transmission Equipment: $ millions	375.6	390.5	403.7	415.8
Cables: $ millions	226.3	237.5	350.8	360.9
Satellites: $ millions	45.7	47.8	55.6	70.4
Data Communications Equipment: $ millions	95.6	115.4	195.6	275.4
PBX:				
Total value: $ millions	150.1	155.2	161.5	170.2
Total lines sold annually (000 lines)	250.2	258.7	269.2	283.7
Total installed lines (000 lines)	1,667.8	1,724.4	1,794.4	2,026.2
Key Systems:				
Total value: $ millions	30.0	30.5	31.2	33.8
Total lines sold annually (000 lines)	120.0	122.0	124.8	136.8
Total installed lines (000 lines)	800.5	813.3	832.0	912.4
Facsimile Equipment: $ millions	174.3	200.5	235.6	250.6
Other CPE: $ millions	45.6	50.5	57.6	70.5
Mobile Communications:				
Total value: $ millions	75.4	80.5	82.5	95.7
Cellular market: $ millions	50.7	65.6	75.6	85.4
Cellular subscribers (000)	5.5	29.8	34.4	42.7
Other Equipment	55.6	72.5	70.4	87.2
Total $:	$ 1,676.0	$ 1,782.0	$ 2,195.3	$ 2,421.0

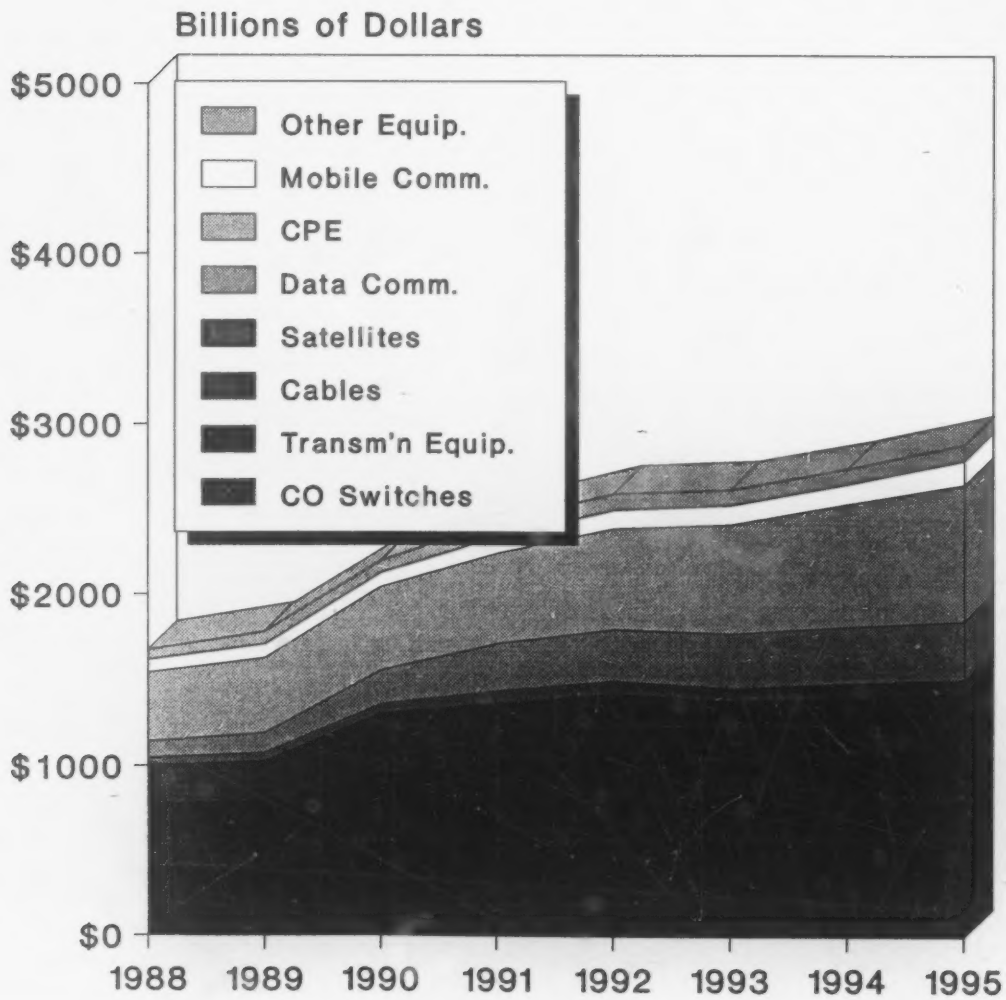
TABLE 31 (Continued)

The Spanish Telecommunications Equipment Marketplace, 1988-1995

SPAIN	1992	1993	1994	1995
Central Office Switches: $ millions	$ 620.3	$ 575.5	$ 595.4	$ 599.7
Transmission Equipment: $ millions	420.2	422.5	428.7	435.6
Cables: $ millions	380.1	382.5	385.6	393.3
Satellites: $ millions	74.9	75.6	77.8	80.3
Data Communications Equipment: $ millions	299.3	315.7	325.2	337.9
PBX:				
Total value: $ millions	180.5	185.7	187.2	190.6
Total lines sold annually (000 lines)	300.8	312.1	314.6	317.7
Total installed lines (000 lines)	2,035.6	2,080.7	2,097.5	2,107.8
Key Systems:				
Total value: $ millions	37.6	41.2	40.1	41.4
Total lines sold annually (000 lines)	152.2	166.8	162.3	168.9
Total installed lines (000 lines)	1,014.7	1,112.0	1,117.6	1,126.5
Facsimile Equipment: $ millions	295.7	325.7	404.5	475.6
Other CPE: $ millions	75.6	83.7	85.5	90.2
Mobile Communications:				
Total value: $ millions	109.6	115.7	120.3	145.6
Cellular market: $ millions	95.8	100.9	107.3	120.5
Cellular subscribers (000)	47.9	59.4	63.1	70.9
Other Equipment	95.3	90.2	89.6	95.4
Total $:	$ 2,589.1	$ 2,614.0	$ 2,740.0	$ 2,886.0

FIGURE 15

Spanish Market for Telecommunications Equipment 1988 - 1995



UNITED KINGDOM

BACKGROUND

The United Kingdom (U.K.) is an island nation off the northwest coast of the European continent. The U.K., including Northern Ireland, oocupies 93,598 square miles. The population is approximately 58 million inhabitants and 23 million households. In 1989, the U.K.'s GNP stood at approximately $931.5 billion. The government is a constitutional monarchy with two legislative houses. The head of the government is the Prime Minister. The capital of the U.K. is London. The U.K. joined the European Community in 1973 along with Ireland and Denmark, becoming the seventh, eighth, and ninth members of the Community.

The general oversight of telecommunications activity in the U.K. generally falls to the Department of Trade and Industry (DTI). That body, along with the independent agency, the Office of Telecommunications (OFTEL), sets telecommunications policies for the U.K. Generally, DTI is responsible for authorizing carriers to operate telecommunications systems and provide service. DTI also has the mandate to conduct the type approval process for telecommunications apparatus. It has delegated much of that responsibilty to the British Approvals Board for Telecommunications (BABT). OFTEL, responsible for the day-to-day regulatory activity, is the agency responsible for overseeing competition in telecommunication services, licensing telecommunications providers, and certification of customer premises equipment.

OFTEL was set up under the the Telecommunications Act of 1984. It is a nonministerial department under the management of a Director General of Telecommunications, also independent of ministerial control. OFTEL is divided into six branches with varying responsibilities.

TELECOMMUNICATIONS POLICY

The telecommunications marketplace in the U.K. is the most liberal in the EC. The British Telecommunications Act of 1981 separated telecommunications services from the Post Office and established British Telecom as a state corporation. In 1984, British Telecom became a private corporation open to competition. Currently, more than 50 percent of its stock is in private hands.

British Telecom is still the predominant carrier of telecommunications traffic in the United Kingdom. It is obligated to provide universal service and interconnection for licensed systems without price discrimination. In February 1982, Mercury Communications, a subsidiary of Cable and Wireless, received a 25-year license to operate an independent digital network to carry voice and data in competition with British Telecom. Mercury currently has about five percent of the services market. The British government will conduct a review of the duopoly environment in November of 1990 to determine what changes should be made to enhance competition.

Other specialized licensed telecommunications operators are the Hull Corporation (providing services in the municipality of Kingston-upon-Hull), CellNet (cellular), Vodaphone (cellular), nine

cable TV operators, three personal communications network (PCN) operators (Unitel, Microtel, and Mercury PCN) and independent carriers operating in the Channel Islands of Guernsey and Jersey and in the Isle of Man. Other service providers are likely to spring up in mobile communications, enhanced text, data, and other non-voice services. For instance, the DTI recently authorized five new carriers to offer mobile data communications. They are Motorola-Storno, Hutchinson, RAM Mobile Data, Digital Mobile Communications Ltd., and Cognito Ltd.

Procurement of network equipment is open to international competitive bidding. While equipment purchases by British Telecom and Mercury tend to favor local manufacturers of telecommunicaitons equipment, significant opportunities exist for foreign companies interested in joint ventures or licensing and for companies supplying equipment to specialized carriers.

Resale for data communications services is allowed. Simple resale for voice traffic is currently permitted domestically but is prohibited internationally. The U.K. plans to consider liberalization of international resale in the near future.

TELECOMMUNICATIONS INFRASTRUCTURE

Users tend to agree that the network infrastructure in the United Kingdom is one of the most advanced in the EC. For instance, in 1988, British Telecom launched a program to link businesses in London based on the latest fiber optic and transmission technologies. Similar programs are also underway in other major cities, such as Manchester and Birmingham.

Users also rate the carriers fairly high for quality of service and responsiveness. Most attribute the good state of the infrastructure to competition, which has kept tariffs and equipment at relatively low rates, especially compared with most of the rest of the EC.

In one area, the U.K. is the undisputed world leader. That is in the development of personal communications networks (PCN). These networks are similar to cellular but currently allow only outgoing calls, and must be within sight of a transmitter. The phones themselves are lightweight and relatively inexpensive. There are currently about 4,500 PCN subscribers. Other countries, including the United States, are developing the technology.

The United Kingdom had some 35 million telephones in use in 1989 attached to about 25 million access lines. The U.K. has a telephone penetration of about 65 for every 100 inhabitants. The total national traffic in 1989 amounted to almost 40 billion calls. The bulk of the calls were local. Network operators earned approximately $20.4 billion in 1989, up considerably from $9.0 billion in 1985. The bulk of the revenue was for basic services.

TELECOMMUNICATIONS MARKET

The market for telecommunications equipment in the United Kingdom is one of the most dynamic and promising of the EC, especially for foreign suppliers. The total U.K. market increased from $3.6 billion in 1988 to $4.4 billion in 1990. Estimates forecast that it will grow rapidly to $6.6 billion by 1995. Competition in the services area has greatly stimulated the

demand for equipment. For instance, British Telecom intends to invest $3.5 billion a year on capital expenditures to modernize the network. It is also looking for partners for a $35 billion plan to wire the entire country with fiber optics. Mercury is also committed to an all-digital network and has been investing heavily to achieve that.

The largest markets in the U.K. by 1995 will be for mobile communications equipment ($1.1 billion), switching equipment ($1.1 billion), transmission equipment ($950.8 million), cables ($710.8 million), data communications equipment ($750.2 million), and facsimile terminals ($608.0 million). The fastest growing of those will be mobile communications (up from $485.6 million in 1988); data communications equipment (up from $279.0 million in 1988); and fax terminals (up from $195.3 million in 1988).

The prospects look very encouraging for foreign suppliers. Foreign firms should be target the market for equipment used by specialized carriers, many of which have significant foreign ties, as well as the business market. U.K. users are becoming increasingly sophisticated and demanding. They are looking for the latest technology available. This should bode especially well for data communications and mobile communications equipment suppliers. Other markets that should attract international attention are fiber optics (especially if British Telecom succeeds in getting partners to rewire the nation), and specialized customer premises equipment such as voice processing and call accounting.

One other market that is just beginning to blossom in the United Kingdom is centrex. For the most part, the U.K is the only EC member that has centrex service available on a commercial basis. This means that as centrex develops in the U.K., there will be a growing opportunity for centrex CPE.

In general, the U.K. should be considered by all companies wanting to penetrate the European marketplace. Considering the similarities between the U.S. and U.K. markets, it is a relatively painless way for U.S. suppliers to get their feet wet.

TABLE 32

The British Telecommunications Infrastructure, 1985-1990

UNITED KINGDOM	1985	1986	1987
Telephone Service:			
Telephone sets in use (000)	*29,750.1	*31,256.2	*33,452.1
Total access lines (000)	20,921.0	21,653.6	22,137.0
Residential lines (000)	16,737.0	17,323.1	17,710.0
Business lines (000)	4,184.0	4,330.5	4,427.0
Total network access line capacity (000)	24,162.0	24,318.0	25,957.0
New applications for service (000)	1,765.0	1,887.1	1,813.0
Total demand for service (includes moves and changes)	*2,206.2	*2,358.8	*2,266.3
Waiting list for new service (000)	-0-	-0-	-0-
Pay telephones in service (000)	382.8	384.0	384.1
Total national traffic (in millions of calls)	24,643.0	*27,500.5	*32,575.4
Total local traffic (in millions of calls)	20,315.0	*23,500.1	*25,627.3
Total toll traffic (in millions of calls)	4,328.0	*4,000.4	*6,948.1
Total outgoing international traffic (in millions of calls)	199.4	*205.6	*221.4
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to dedicated public data networks (000)	N/A	N/A	N/A
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$ 7,844,706.1	$10,143,056.5	$13,378,333.3
Income from other telecom services ($000)	1,158,822.9	1,505,554.6	2,328,333.8
Total income from telecom services ($000)	9,003,529.4	11,648,611.1	15,706,667.1
Total expenses for providing telecom services ($000)	8,215,294.1	10,134,722.2	14,458,333.3
Net income ($000)	788,235.3	1,513,888.9	1,248,333.8
Annual investment in the network ($000)	2,210,588.2	2,740,278.1	3,511,667.1
Annual investment for switching equipment ($000)	N/A	N/A	N/A
Ratios:			
Telephone access lines per 100 inhabitants	37.1	38.3	39.0
Telephone penetration per 100 inhabitants	55.4	57.2	61.2
Telecommunications investment as a share of gross domestic product	7.1	6.4	6.5
Telecommunications investment as a share of gross fixed-capital formation	33.3	33.0	3[illegible]5

* Estimated

Source: Based on statistics of the International Telecommunications Union

TABLE 32 (Continued)

The British Telecommunications Infrastructure, 1985-1990

UNITED KINGDOM	1988	1989(e)	1990(p)
Telephone Service:			
Telephone sets in use (000)	*34,570.2	35,020.1	38,255.7
Total access lines (000)	*24,720.1	24,950.5	26,224.2
Residential lines (000)	*19,776.1	19,960.5	21,215.3
Business lines	4,944.0	4,990.0	5,008.9
Total network access line capacity (000)	*28,550.0	28,975.1	29,200.5
New applications for service (000)	*1,802.1	1,835.5	1,920.4
Total demand for service (includes moves and changes)	*2,403.0	2,293.8	2,437.6
Waiting list for new service (000)	-0-	-0-	-0-
Pay telephones in service (000)	384.1	384.7	385.3
Total national traffic (in millions of calls)	*37,551.5	39,555.2	41,824.1
Total local traffic (in millions of calls)	*30,020.1	31,225.6	33,257.4
Total toll traffic (in millions of calls)	*7,501.4	8,329.6	8,566.7
Total outgoing international traffic (in millions of calls)	*236.5	*255.4	280.0
Data Transmission:			
Number of data CPE attached to the public telephone network (000)	N/A	N/A	N/A
Number of private leased lines (000)	N/A	N/A	N/A
Number of data CPE attached to the dedicated public data networks (000)	N/A	N/A	N/A
Telecommunication Services Financial Results:			
Income from telephone service ($000)	$*15,255,479.2	$17,245,714.3	$19,653,244.5
Income from other telecom services ($000)	*2,545,622.1	3,151,466.2	3,700,525.6
Total income from telecom services ($000)	17,801,101.3	20,397,180.5	23,353,770.1
Total expenses for providing telecom services ($000)	*16,475,657.2	18,862,404.9	20,650,515.2
Net income ($000)	*1,325,444.1	1,534,775.1	2,703,254.9
Annual investment in the network ($000)	5,004,371.2	6,225,453.2	6,775,453.4
Annual investment for switching equipment ($000)	N/A	N/A	N/A
Ratios:			
Telephone access lines per 100 inhabitants	42.4	44.2	45.2
Telephone penetration per 100 inhabitants	63.2	65.1	69.5
Telecommunications investment as a share of gross domestic product	6.7	6.8	6.9
Telecommunications investment as a share of gross fixed-capital formation	33.2	33.0	34.0

* Estimated
Source: Based on statistics of the International Telecommunications Union

TABLE 33

The British Telecommunications Equipment Marketplace, 1988-1995

UNITED KINGDOM	1988	1989	1990	1991
Central Office Switches: $ millions	$ 755.5	$ 770.4	$ 785.5	$ 820.6
Transmission Equipment: $ millions	665.3	687.4	715.5	795.5
Cables: $ millions	395.5	437.6	510.0	630.4
Satellites: $ millions	63.8	75.4	82.9	95.6
Data Communications Equipment: $ millions	279.0	294.8	325.9	450.7
PBX:				
Total value: $ millions	405.9	409.6	407.8	408.9
Total lines sold annually (000 lines)	676.5	692.7	685.4	689.9
Total installed lines (000 lines)	4,510.0	4,551.3	4,569.3	4,599.3
Key Systems:				
Total value: $ millions	103.6	105.8	104.7	106.9
Total lines sold annually (000 lines)	414.4	423.2	427.3	436.3
Total installed lines (000 lines)	2,762.6	2,821.3	2,848.6	2,908.7
Facsimile Equipment: $ millions	195.3	210.7	275.3	310.8
Other CPE: $ millions	100.3	134.8	155.7	171.2
Mobile Communications:				
Total value: $ millions	485.6	796.3	795.6	805.4
Cellular market: $ millions	430.2	741.2	770.5	785.6
Cellular subscribers (000)	292.1	570.0	592.7	654.7
Other Equipment	155.4	176.3	199.4	201.3
Total Value: $ millions	$ 3,625.2	$ 4,099.1	$ 4,358.3	$ 4,797.3

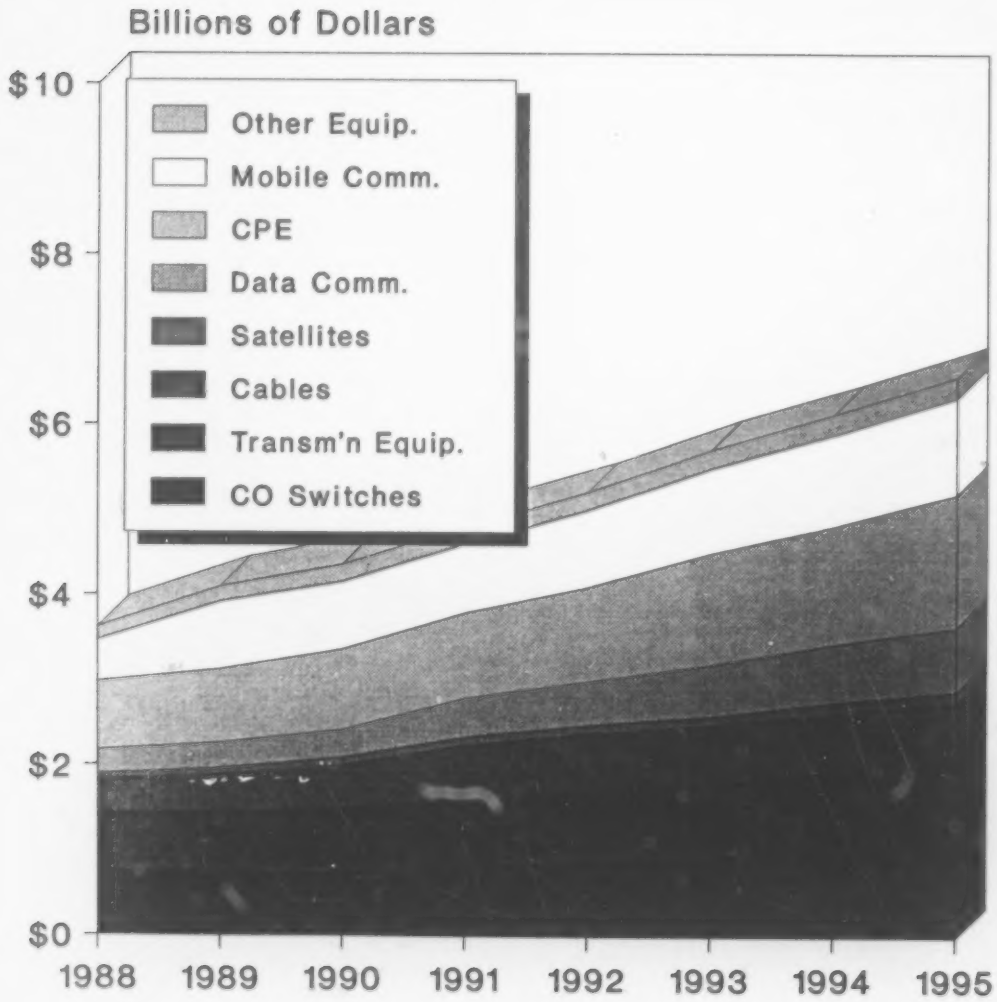
TABLE 33 (Continued)

The British Telecommunications Equipment Marketplace, 1988-1995

UNITED KINGDOM	1992	1993	1994	1995
Central Office Switches: $ millions	$ 910.8	$ 930.6	$ 1,015.5	$ 1,099.6
Transmission Equipment: $ millions	800.3	877.6	925.0	950.8
Cables: $ millions	675.8	679.5	700.3	710.8
Satellites: $ millions	98.7	103.6	115.5	125.4
Data Communications Equipment: $ millions	510.7	603.8	685.7	750.2
PBX:				
Total value: $ millions	410.3	415.9	420.3	423.8
Total lines sold annually (000 lines)	701.1	725.4	730.5	744.4
Total installed lines (000 lines)	4,674.0	4,833.3	4,870.0	4,962.7
Key Systems:				
Total value: $ millions	108.9	109.7	115.4	118.6
Total lines sold annually (000 lines)	444.5	457.1	480.8	494.2
Total installed lines (000 lines)	2,963.3	3,047.3	3,205.3	3,294.7
Facsimile Equipment: $ millions	375.9	496.3	525.4	608.0
Other CPE: $ millions	205.6	275.9	310.8	405.6
Mobile Communications:				
Total value: $ millions	899.6	995.3	1,075.4	1,138.6
Cellular market: $ millions	845.3	904.8	955.6	1,002.3
Cellular subscribers (000)	712.4	754.0	962.5	1,012.6
Other Equipment	210.5	213.6	235.4	240.6
Total Value: $ millions	$ 5,207.1	$ 5,702.0	$ 6,125.0	$ 6,572.0

FIGURE 16

British Market for Telecommunications Equipment 1988 - 1995



APPENDIX A

MILESTONES TO EC TELECOMMUNICATIONS INTEGRATION

MILESTONES TO EC TELECOMMUNICATIONS INTEGRATION

March 1957	Belgium, France, West Germany, Italy, Luxembourg, and the Netherlands sign the Treaty of Rome, creating the European Economic Community (EEC), dubbed the "the Six."
July 1966	The executive institutions and Council of Ministers of the EEC, ECSC (European Coal and Steel Community), and EURATOM (European Atomic Energy Community) merge to form a single Commission of the European Communities (EC) and Council of Ministers implementing an April 1965 agreement.)
July 1968	The EC members establish a Customs Union removing all customs duties between member states of the EC.
January 1973	The United Kingdom, Denmark, and Ireland join the EC, creating "the Nine."
December 1974	The EC completes an agreement to establish the European Monetary System (EMS) to be implemented March 1979. The EMS consists of a European currency unit (ECU), an exchange and information mechanism, credit facilities, and transfer arrangements.
March 1979	The EMS goes into effect.
June 1979	EC countries hold their first elections for the European Parliament.
January 1981	Greece joins the EC, becoming the 10th member.
June 1983	The European Council signed the Solemn Declaration of Stuttgart, which states the EC will seek a European Union, i.e., a more complete economic and political integration.
May 1984	The EC Council adopts a telecommunications action program to create an EC-wide market for telecommunications equipment, improve the development of advanced telecommunications services, improve access to advanced telecommunictions for less developed regions of the EC, and to coordingate negotiating positions vis-a-vis international organizations.
July 1985	EC Council decision to institute a pan-EC R&D consortium of 120 organizations to advance communications technologies in Europe, dubbed "RACE." Initial funding amounts to almost $50 million. Total budget for

	1987-91 expected to be about $1.4 billion. The principal goal of RACE is to implement an EC-wide integrated broadband communications network, with ISDN as an integral component.
December 1985	EC leaders agree to amend 1957 Treaty of Rome in order to remove trade barriers between the EC members.
January 1986	Spain and Portugal admitted to the EC as the community's 11th and 12th members.
July 1986	EC Council issues first directive on mutual recognition of type approval for telecommunications terminal equipment.
October 1986	EC Council institutes an EC-wide program for the development of telecommunications infrastuctures of less developed regions of the Community, dubbed the "STAR" program. The program's budget for 1987-91 is expected to amount to over $15 billion. Major beneficiaries have been Ireland, Greece, Spain, and Portugal.
December 1986	EC Council issues a recommendation calling for the coordinated introduction of ISDN in the EC by 1992.
June 1987	The Single European Act, signed in February 1986, is entered into force. This act called for the completion of the integration of the economies of the EC members by December 31, 1992.
June 1987	The EC Commission publishes the "Green Paper" the principal blueprint for integration of EC telecommunications. This document has since formed the basis for all subsequent EC directives on EC telecommunications.
June 1987	The EC Council issues a recommendation calling for the coordinated introduction of pan-EC digital mobile communications by 1992.
March 1988	The EC Council establishes the European Telecommunications Standards Institute (ETSI) to support the implementation of standards proferred by the International Telecommunications Union's (ITU) Consultative Committee on Telephone and Telegraph (CCITT). ETSI is also a forum for cooperation between network operators, industry, and end users. ETSI formulates specifications, such as interface standards for terminal equipment.
May 1988	The EC Commission issued a directive calling for an open internal telecommunications terminal equipment market in the EC, including the

	mutual recognition of certification and type approvals between the member states.
June 1988	A group of EC members challenges the legality of the way the EC Commission issued the terminal equipment directive and contests the EC directive in proceedings before the European Court of Justice.
June 1988	The first EC Council of Telecommunications Ministers approves the Community Resolution on a Common Market for Telecommunications Services and Equipment by 1992. The resolution outlines 11 major goals for EC telecommunications, calling for open markets for equipment and services.
October 1988	The EC Commission issues proposals for a directive calling for the phased implementation of open procurement policies of network operators to bidders from member countries. By 1992, 100 percent of public procurement of network equipment is to be open. This proposed directive was revised in July 1989.
May 1989	The EC Commission submits a proposal to implement a pan-EC paging system--the European Radio Messaging System (ERMES). When implemented fully, the system will offer tone, numeric, and alphanumeric messages anywhere in the Community.
June 1989	The EC Commission proposes a directive to eliminate the exclusive or special rights of the PTTs in the field of telecommunications services, with the exception of voice telephony and the network infrastructure.
August 1989	The EC Commission proposes a directive to open the EC services marketplace to competition through a concept dubbed as "open network provision" (ONP). The ONP proposal describes how competitive service providers can access the network infrastructure to offer value-added services.
December 1989	The EC Commission and member states reaches agreement on revision to both the draft Services Directive and the ONP Directive. This agreement draws the line between basic voice and all other traffic, with the understanding that voice traffic remains a monopoly service and all other services will be open to competition in stages. The parties agree to a review by 1993 of the continued monopoly provision of voice traffic.
February 1990	The Advocate General of the European Court of Justice makes a recommendation to the Court that the EC Commission proceeded improperly in the way it pursued opening the EC terminal equipment

	market. The Court usually accepts the Advocate General's position, but to date there has been no final action.
February 1990	The EC Council of Ministers reaches a common position on the directive on public procurement policies of telecommunications equipment. To date, implementation of the directive is still pending.
July 1990	Implementation date for the contested terminal equipment directive. While under Court review, EC members were obligated to follow directives anyway. However, indications are that many countries are not complying and are awaiting the Court's decision.
July 1990	The Services Directive and the ONP Directive are implemented, allowing competitive service providers to offer non-voice telecommunications services in competition with member PTTs.
August 1990	The EC Commission issues a draft directive to establish the Approvals Committee for Telecommunications Equipment (ACTE) which will oversee and coordinate with national standards bodies and laboratories which carry out the product testing and certification.

APPENDIX B

THE EC GREEN PAPER ON TELECOMMUNICATIONS

THE EC GREEN PAPER ON TELECOMMUNICATIONS

In June 1987 the EC Commission issued a report that would form the basis of a plan of action to unite telecommunications policy and infrastructure across the European Community. This report, commonly referred to as the "Green Paper on Telecommunications," was prepared in recognition of the need to develop a unified, comprehensive approach to the implementation of a common telecommunications marketplace as an integral part of "Europe 1992."

The Green Paper spells out very specific guidelines and proposals for how to achieve a strong, unified telecommunications marketplace in the EC including:

- Phased opening up of the terminal equipment market to competition. This would include mutually accepted type approval by certification bodies in the different member states. Provision of the customer's first telephone set could be excluded from unrestricted provision on a temporary basis.

- Substantial opening up of the telecommunications services market to competition, although excluding for the near future basic services considered to to be important to ensure current public service goals and objectives. One initiative of particular importance is the directive for open network provision (ONP).

- The right for services to operate across member states' national borders.

- Continued exclusivity or special rights for telecommunications administrations (public and private carriers) to supply and operate the network infrastructure.

- Clear separation of regulatory and operational functions of telecommunications administrations. Regulatory activities include licensing, control of type of approval and interface specifications, allocation of frequencies, and general surveillance of network usage conditions.

- Strict adherence to EC directives concerning the practices of cross subsidization of activities in the competitive services sector with revenue from the protected sector.

- Opening of the market for satellite ground stations to the extent that the equipment is considered terminal equipment and unbundled from the provision of the service.

- Recognition that telecommunications tariffs should be based on the cost of providing service and that there is some level of commonality of tariffs among the various members.

- Developing a concensus from all industry participants in order to smooth the transition and to maximize the opportunities presented by the new networks and services to create employment.

- Using telecommunications to accelerate economic development and reduce the isolation of outlying regions of the EC.

- Establishing common EC positions within various international bodies such as the ITU, GATT, etc.

- Ensuring the interoperability of networks, terminals, and services.

- Creation of a European Standards Institute, the objective of which would be to facilitate and accelerate establishment of the universal standards and specifications

indispensable to an open and competitive market environment and to development of European information technology.

Through these proposals, the EC Commission recognized the changes to business and consumer habits that have been wrought as a result of the merger of telecommunications and computer technology. The merger is transforming the industrial and socioeconomic face of Europe at a rapid pace and is being spurred by the accelerating march of technology. A technologically advanced, low-cost, European-wide telecommunications network will provide an essential component for improving the competitiveness of the European economy, while also strengthening EC cohesion.

It has become crystal clear to European visionaries that only through a unified telecommunications marketplace can the citizens of the EC take full advantage of the emergence of the global information age.

APPENDIX C

ADDITIONAL SOURCES OF INFORMATION

ADDITIONAL SOURCES OF INFORMATION

BELGIUM

PTT

Administration/operation:
Regie des Telegraphes et des Telephones (RTT)
Rue des Palais 42 B3
B-1030 Brussels Belgium
Tel: 213 41 11
Telex: 29154 gentl b
Fax: 218 28 39

STANDARDS ORGANIZATIONS

GATT:

Ministere des Affaires Economiques
Administration du Commerce
Rue J. A. De Mot 24-46
1040 Brussels Belgium

IEC:

Comite Electrotechnique Belge (CEB)
3, Galerie Ravenstein
Boite 11
B-1000 Brussels Belgium
Tel: 512 00 28

ISO:

Institut Belge de Normalisation (IBN)
Av. de la Brabanconne 29
B-1040 Brussels 4 Belgium
Tel: 734 92 05
Telex: 23877 benor

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%

Exceptions:
Modems: 4.6%
Portable receivers for calling and paging: 12%

Radio Telegraphic/Telephonic Transmission & Reception Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 19%

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or
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David D. Nelson
Commercial Section
U.S. Consulate
Rubens Center
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Telex: 31966
or
U.S. Consulate
APO NY 09667

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Fax: (2) 513 79 28

DENMARK

PTT

Administration/operation (telex, toll and international telephone):
Ministeriet for offentlige arbejder
Generaldirektoratet for Post-og Telegrafvaesenet Telestyrelsen
Anker Heegaards Gade 4
DK-1503 Copenhagen V Denmark
Tel: 11 33 77
Telex: 27277 teldir dk
Fax: 11 33 77, ex.t. 220

Operation (domestic telephone, region of Zealand):
Kjoebenhavns Telefon Aktieselskab (KTAS) Telefonhuset
Noerregade 21
DK-1199 Copenhagen K Denmark
Tel: 15 10 70
Telex: 19791 ktaskh dk

Operation (domestic telephone, region of northern Jutland):
Jydsk Telefon Aktieselskab (JTAS)
Stovej 30
DK-8310 Arhus-Tranbjerg Denmark
Tel: 29 33 66
Telex: 64320 jtasar dk
Fax: 29 54 99

Operation (domestic telephone, region of southern Jutland):
Fyns Kommunale Telefonselskab (FKT)
Klingenberg 16
DK-5100 Odense C Denmark
Tel: 00 19
Telex: 59803 fktod dk

STANDARDS ORGANIZATIONS

GATT, ISO:

Dansk Standardiseringsraad (DS)
Aurehojvej 12
Postbox 77
DK-2900 Hellerup Denmark
Tel: 62 93 15
Telex: 15615 dansta dk

IEC:

Dansk Elektroteknisk Komite
Strandgade 36, St.
DK-1401 Copenhagen K Denmark
Tel: 57 50 50
Telex: 16600 l660Ob fotex dk

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%

Exceptions:
Portable receivers for calling & paging: 12%
Modems: 4.6%

Radio Telegraphic/Telephonic Transmission & Reception Equip.: 14%

Insulated Electric Wire, Cable, Bars and Strip: 6.5%

Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 22%

COMMERCE DESK OFFICER

Maryanne Lyons
Country Specialist, Denmark
ITA/U.S. Department of Commerce
Rm. 3413
Washington, D.C. 20230
(202) 377-3254

U.S. COMMERCIAL POSTS ABROAD

Max Miles
Commercial Section
American Embassy
Dag Hammarskjolds Alle 24
2100 Copenhagen 0 Denmark
Tel: 42 31 44
Telex: 22216
or
American Embassy
APO NY 09170

EMBASSY IN THE UNITED STATES

Royal Danish Embassy
3200 Whitehaven St., NW
Washington, D.C. 20008
(202) 234-4300

CHAMBERS OF COMMERCE

Danish-American Chamber of Commerce
825 3rd Avenue
New York, NY 10019

FRANCE

PTT

Administration/operation:
Ministere des Postes, des Telecommunications et de la Telediffusion
Direction General des Telecommunications
20 Avenue de Segur, 7 o
F-75700 Paris France
Tel: 564 22 22
Telex: 250310 gentel 250310f

STANDARDS ORGANIZATIONS

GATT, ISO:

Centre d'Information sur les Normes et Reglements Techniques (CINORTECH)
Association Francaise de Normalisation (AFNOR)
Tour Europe CEDEX 7
92080 Paris La Defense France
Tel: 778 13 26
Telex: 611974 afnor f

IEC:

Comite Electrotechnique Francais
12, place de Etats-Unis
F-75783 Paris Cedex 16 France
Tel: 723 72 57
Telex: 620434 cefute 620434f

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Exceptions:
Portable receivers for calling and paging: 12%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission & Reception Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 18.6%

COMMERCE DESK OFFICER

Maria Aronson
Country Specialist, France
ITA/U.S. Department of Commerce
Rm. 3042
Washington, D.C. 20230
(202) 377-8008

U.S. COMMERCIAL POSTS ABROAD

E. William Tatge
Commercial Section
American Embassy
2 Ave. Gabriel
75382 Paris Cedex 08 France
Tel: 296-1202, 261-8075
Telex: 650221
or
American Embassy
APO NY 09777

Commercial Section
U.S. Consulate
22 Cours du Marchal Foch
33080 Bordeaux Cedex France

Tel: 52 65 95
Telex: 540918f

Commercial Section
U.S. Consulate
7 Quai General Sarrail
69454 Lyon CEDEX 3 France
Tel: 824 68 49
Telex: uscsul 380597f

Daniel P. Carbognin
Commercial Section
U.S. Consulate
No. 9 Rue Armeny
13006 Marseille France
Tel: 54 92 00
Telex: 430597

Commercial Section
U.S. Consulate
15 Ave. d'Alsace
67082 Strasbourg CEDEX France
Tel: 35 31 04/05/06
Telex: 870907
or
U.S. Consulate
APO NY 09777

U.S. Department of State:
Commercial Section
U.S. Consulate
1 Rue du Marchal Joffre
06000 Nice France
Tel: 88 89 55; 88 87 72

EMBASSY IN THE UNITED STATES

Embassy of France
4101 Reservoir Rd., NW
Washington, D.C. 20007
(202) 944-6000

CHAMBERS OF COMMERCE

French-American Chamber of Commerce
509 Madison Ave.
New York, NY 10022
(212) 371-4466

W. Barrett Dower
Executive Director
American Chamber of Commerce in France
21, Ave. George V
F-75008 Paris France
Tel: 23 70 28; 23 80 26

George P. Larounis,President
The American Chamber of Commerce in France
21, Ave. George V
F-75008 Paris France
Tel: 23 70 28; 23 80 26

GERMANY (WEST)

PTT

Adminstration
Bundesmisterium Fur Das Post-Und Fernmeldewesen
Deutsche Bundespost
Adenaueralle 81
Bonn 1 D-5300 Germany
Tel: 49 228-140
Telex: 8861 101 bpm d

STANDARDS ORGANIZATIONS

GATT, ISO:

Deutches Informationszentrum fuer Technische Regeln (DITR)
Deutsches Institut fuer Normung (DIN)
Burggrafenstrasse 4-10
Postelephoneach 1107
D-1000 Berlin 30 Germany
Tel: 260-1600
Telex: 184273 din d

IEC:

Deutches Komitee der IEC
Deutsches Elektrotechnische Kommission im DIN und VDE (DKE)
Stresemannallee 15
D-6000 Frankfurt am Main 70 West Germany
Tel: 6 30 81
Telex: 412871 vdetz d

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Exceptions:
Portable receivers for calling & paging: 12%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission & Reception Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances Instruments and Lasers): 8%

OTHER TAXES

VAT: 14%

COMMERCE DESK OFFICER

Velizar Stanoyevitch
Country Specialist, West Germany
ITA/U.S. Department of Commerce
Rm. 3411
Washington, D.C. 20230
(202) 377-2434

U.S. COMMERCIAL POSTS ABROAD

Kenneth D. Blum
Commercial Section
American Embassy
Delchmannsaue
5300-Bonn 2 Germany
Tel: 339-3390

Telex: 885452
or
American Embassy
APO NY 09080

John R. Roose
Commercial Section
U.S. Export Office
c/o American Embassy
Delchmannsaue
5300-Bonn 2 West Germany
Tel: 339-3390
Telex: 885452
or
American Embassy
APO NY 09080

Edward B. O'Donnell, Jr.
Commercial Section
Amercian Embassy
Clayallee 170
D-1000 Berlin 33 (Dahlem) West Germany
Tel: 819-7561
Telex: 183701 usber-d
or
American Embassy
APO NY 09742

Patrick T. O'Connor
Commercial Section
U.S. Consulate
Cecillenallee 5
Box 515
4000 Duesseldorf 30 Germany
Tel: 49 00 81
Telex: 8584246
or
American Embassy
APO NY 09712

Walter Hage
Commercial Section
U.S. Consulate

Siesmayerstrasse 21
6000 Frankfurt Germany
Tel: 74 00 71
Telex: 412589 uscon-d
or
U.S. Consulate
APO NY 09213

Daniel K. Loncar
Commercial Section
U.S. Consulate
Alsterufer 27/28
2000 Hamburg 36 Germany
Tel: 44 10 61
Telex: 213777
or
U.S. Consulate
APO NY 09215

Thomas L. Boam
Commercial Section
U.S. Consulate
Urbanstrasse 7
7000 Stutgart Germany
Tel: 21 02 21
Telex: 0722945
or
U.S. Consulate
APO NY 09154

Kay R. Kuhlman
Commercial Section
U.S. Consulate
Koeniginstrasse 5
8000 Muenchen 22 Germany
Tel: 2 30 11
Telex: 522697 acgm d
or
U.S. Consulate
APO NY 09108

U.S. Department of State:
Commercial Section
U.S. Consulate

President-Kennedy-Plaza
Box 39
2800 Bremen 1 Germany
Tel: 32 16 09
or
U.S. Consulate
APO NY 09355

EMBASSY IN THE UNITED STATES

Embassy of the Federal Republic of Germany
4645 Reservoir Rd., NW
Washington, D.C. 20007
(202) 298-4000

CHAMBERS OF COMMERCE

German-American Chamber of Commerce, Inc.
666 Fifth Ave.
New York, NY 10103
(212) 974-8830

German-American Chamber of Commerce of Chicago
104 South Michigan Avenue
Chicago, Illinois 60603-5978
(312) 782-8557

German-American Chamber of Commerce of Los Angeles, Inc.
1 Park Plaza Bldg.
3250 Wilshire Bldg.
Rm. 1112
Los Angeles, CA 90010
(213) 381-2236

German-American Chamber of Commerce of the Pacific Coast, Inc.
465 California St.
Suite 910
San Francisco, CA 94104
(415) 392-2262

German-American Chamber of Commerce
One Farragut Square South
Washington, DC 20006
(202) 347-0247

Albert O. Hicks
The American Chamber of Commerce in Germany
Rossmarkt 12
Postfach 100 162
D-6000 Frankfurt Main 1 Germany
Tel: 28 34 01
Telex: 4189679 acc d

Thomas T. Krauss
The American Chamber of Commerce in Germany
Rossmarkt 12
Postfach 100 162
D-6000 Frankfurt Main 1 Germany
Tel: 28 34 01
Telex: 4189679 acc d

Branch Office - Berlin
Brita U. Lambert
American Chamber of Commerce in Germany
Budapesterstrasse 31
D-1000 Berlin 30 Germany
Tel: 261-5586

GREECE

PTT

Administration:
Ministry of Communications
General Directorate of Post and Telecommunications
49 Syngrou Ave.
Athens Greece
Tel: 921 53 59
Telex: 216369 ysy gr

Operation:
Hellenic Telecommunications Organization, S.A. (OTE)
15, Stadiou St.
Athens 124 Greece
Tel: 323 20 01
Telex: 215432 depr gr

STANDARDS ORGANIZATIONS

GATT:

Greek Ministry of Commerce
Directorate of International Organizations and Conventions
Ministry of Commerce Bldg.
Cannings Square
Athens Greece
Tel: 360 22 95
Telex: 219033 ypem gr

ISO:

Hellenic Organization for Standardization (ELOT)
Didotou 15
Athens 144 Greece
Tel: 360 95 17
Telex: 219621 elot gr

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Exceptions:
Portable receivers for calling and paging: 12%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission & Reception Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 16%

COMMERCE DESK OFFICER

Ann Corro
Country Specialist, Greece
ITA/U.S. Department of Commerce
Rm. 3044
Washington, D.C. 20230
(202) 377-3945

U.S. COMMERCIAL POSTS ABROAD

Robert A. Kohn
Commercial Section
Amercian Embassy
91 Vasilissis Sphias Blvd.
Athens Greece
Tel: 721-2951, 721-8401
Telex: 215548
or
American Embassy
APO NY 09253

Regional Trade Development Office
c/o Amercian Embassy
91 Vasilissis Sophias Blvd.
Athens Greece
Tel: 721-2951, 721-8401
Telex: 215548

Harry J. Hulings, Jr.
Commercial Section
U.S. Consulate
59 Leoforos Nikis
GR-546-22 Thessaloniki Greece
Tel: 266 121
Telex: 041/2285
or
U.S. Consulate
APO NY 09693

EMBASSY IN THE UNITED STATES

Embassy of Greece
2221 Massachusettes Ave., NW
Washington, D.C. 20009
(202) 667-3168 to 3170; 3094/95

CHAMBERS OF COMMERCE

Hellenic-American Chamber of Commerce
29 Broadway
Rm. 1508

New York, NY 10006
(212) 943-8594

Symeon G.Tsomokos, General Manager
American-Hellenic Chamber of Commerce
17 Valaoritou St., 2nd Fl.
Athens 134 Greece
Tel: 36 18 385; 36 36 407
Telex: 223063 amch gr
Fax: 361-0170

Charles J. Politis, President
APCO Industries, S.A.
Group Corporate Offices
18 Academias St.
Athens 134 Greece
Tel: (301) 361-8008
Telex: 212404 apcp gr

Demetre N. Petsiavas, General Manager
Petsiavas N., A.E.
11 Nicodemon & Voulis Sts.
Athens 119 Greece
Tel: (301) 323-0451
Telex: 215983 npsa gr

IRELAND

PTT

Administration/operation:
Department of Posts and Telegraphs
Telecommunications Branch
1 Marlborough St.
Dublin 1 Ireland
Tel: 74 88 88

STANDARDS ORGANIZATIONS

GATT:

- International Trade Division
  Department of Industry, Commerce & Tourism
  Kildare St.

Dublin 2 Ireland
Tel: 78 94 11
Telex: 24651 indc ei

IEC, ISO:

Institute for Industrial Research and Standards (IIRS)
Ballymun Rd.
Dublin 9 Ireland
Tel: 37 01 01
Telex: 25449 iirs ei

CUSTOMS DUTIES AND OTHER TAXES *

CUSTOMS DUTIES (as of 1988)

Telphonic Telegraphic Apparatus: 7.5%
Exceptions:
Portable receivers for calling & paging: 12%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission & Reception
Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances Instruments and Lasers): 8%

OTHER TAXES

VAT: 23%

COMMERCE DESK OFFICER

Brenda Hogan
Country Specialist, Ireland
ITA/U.S. Department of Commerce
Rm. 3049
Washington, D.C. 20230
(202) 377-4104

U.S. COMMERCIAL POSTS ABROAD

U.S. Department of State:
E. Mark Linton
Commercial Section
Amercian Embassy

42 Elgin Rd.
Ballsbridge
Dublin Ireland
Tel: 68 87 77
Telex: 25240

EMBASSY IN THE UNITED STATES

Embassy of Ireland
2234 Massachusettes Ave., NW
Washington, D.C. 20008
(202) 462-3939

CHAMBERS OF COMMERCE

Ireland-United States Council for Commerce & Industry, Inc.
460 Park Ave.
New York, NY 10022
(212) 751-2660

Robert P. Chalker
Executive Director
American Chamber of Commerce in Ireland
20 College Green
Dublin 2 Ireland
Tel: (353) 179-3733
Telex: 31187 ucil ei

ITALY

PTT

Administration/operation (telex):
Ministero delle Poste e Telecomunicazioni
Viale America 160
1-00100 Rome Italy
Tel: 542 20 04
Telex: 610070 gentel i

Operation (telephone):
Societa' Italiana per l'Esercizio Telefonico p.a. (SIP)
Via Flaminia, 189
Casella Postale AD 2420
I-00196 Rome Italy

Tel: 3 68 81
Telex: 610467 spigen i

Operation (toll and international telephone):
Azienda di Stato per i Servizi Telefonici (ASST)
160 Viale Europa
Rome Italy
Tel: 542 24 01
Telex: 610045 asst sg i

Operation (international telephone and telex):
Italcable, S.p.A.
Servizi Cablografici, Radiotelegrafici e Radioelettrici, S.p.A.
46-48 Via Calabria
I-00187 Rome Italy
Tel: 4 77 01
Telex: 611146 itc dg

STANDARDS ORGANIZATIONS

GATT:

Consiglio Nazionale delle Richerche
Servizio Transferimento Innovazione Norme Techniche
Viale Liegi 48B
000198 Rome Italy
Tel: 49931
Telex: 612322 cnrpfe i

IEC:

Comitato Elettrotecnico Italiano
Viale Monza 259
I-20126 Milan Italy
Tel: 255 06 41
Telex: 312207 ceitali

ISO:

Ente Nazionale Italiano di Unificazione (UNI)
Piazza Armando Diaz 2
I-20123 Milan Italy
Tel: 87 69 14
Telex: 312381 uni

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Exception:
Portable receivers for calling & paging: 12.0%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission and Reception Equipment: 14.0%
Insulated Electronic Wire, Cable, Bars & Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8.0%

OTHER TAXES:

VAT: 18%

COMMERCE DESK OFFICERS

Noel Negretti
Country Specialist, Italy
ITA/U.S. Department of Commerce
Room 3045
Washington, D.C. 20230
(202) 377-2177

U.S. COMMERCIAL POSTS ABROAD

J. Raymond De Paulo
Commercial Section
American Embassy
Via Veneto 119/A
00187 Rome Italy
Tel: 4674
Telex: 610450 AMBRMA
or American Embassy
APO NY 09794

Dennis A. Foster
Commercial Section
U.S. Consulate
Banca d'America e d'Italia Bldg.
Piazza Portello 6
Genoa Italy
Tel:P 282-741 to 745

Telex: 270324 AMCOGE I
or U.S. Consultate
Box G
APO NY 09794

David A. Ross
Commercial Section
U.S. Consulate
Via Gattamelata 5, 20149
Milan Italy
Tel: 498-2231 to 2243
or U.S. Consulate
Box M
APO NY 09794

Robert D. Culver
U.S. Export Development Office
Via Gattamelata 5
20149 Milan Italy
Tel: 469-6451 to 6454
Telex: 330208 USIMC I

William H. Skok
Commercial Section
U.S. Consulate
Piazza della Republica
80122 Naples Italy
Tel: 660966
Telex: ICA NAPLES 720442 ICANA
or U.S. Consulate
Box 18
FPO NY 09521

Clyde Bishop
Commercial Section
U.S. Consulate
Via Baccarini 1
90143 Palermo Italy
Tel: 291532-35
Telex: 910313 USACON I
or
U.S. Consulate
Box P
APO NY 09794

Thomas J. White
Commercial Section
U.S. Consulate
Lungarno Amerigo Vespucci 38
Florence Italy
Tel: 298-276
Telex: 570577 AMCOFI I
or U.S. Consulate
APO NY 09019

U.S. Department of State:
Commercial Section
U.S. Consulate Via Roma 9
4th Floor
Trieste Italy
Tel: 68728/29
Telex: 460354 AMCITS I
or U.S. Consulate
APO NY 09293

EMBASSY IN THE UNITED STATES

Embassy of Italy
1601 Fuller Street, N.W.
Washington, D.C. 20009
(202) 328-5500

CHAMBERS OF COMMERCE

Italian Chamber of Commerce of Chicago
126 West Grand Avenue
Chicago, IL 60610
(312) 661-1336

Italy-America Chamber of Commerce, Inc.
350 Fifth Avenue
Room 3015
New York, NY 10118
(212) 279-5520
Herman H. Burdick
General Seecretary

American Chamber of Commerce in Italy
Via Cantu 1
20123 Milano Italy
Tel: (2) 86 90
Telex: 35212
Fax: (2) 80 57

Michael N. Bitsas, Partner
Continental European Headquarters
Peat, Marwick, Mitchell & Co.
Via San Paolo 15
20121 Milano Italy
Tel: (392) 869-0661
Telex: 23675

LUXEMBOURG

PTT

Administration/operation:
Administration des Postes et Telecommunications
Division des Telecommunications
17, rue de Hollerich
2999 Luxembourg Luxembourg
Tel: 499-1403
Telex: 3410 ptdt lu
Fax: 47 51 10

STANDARDS ORGANIZATIONS

GATT:

Inspeciation du Travail et des Mines
Rue des Girondins 2
Luxembourg Luxembourg
Tel: 44 37 37

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Radio Telegraphic/Telephonic Transmission & Reception

Equip.: 14%
Exceptions:
Portable receivers for calling & paging: 12%
Modems: 4.6%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 10%

COMMERCE DESK OFFICER

Boyce Fitzpatrick
Country Specialist, Luxembourg
ITA/U.S. Department of Commerce
Rm. 3415
Washington, D.C. 20230
(202) 377-5401

U.S. COMMERCIAL POSTS ABROAD

U.S. Department of State:
Matthew Ward
Commercial Section
American Embassy
22 Blvd. Emmanuel-Servais
2535 Luxembourg Luxembourg
Tel: 4 01 23 to 27
or
American Embassy
APO NY 09132

EMBASSY IN THE UNITED STATES

Embassy of Luxembourg
2200 Massachusettes Ave., NW
Washington, D.C. 20008
(202) 265-4171

CHAMBERS OF COMMERCE

None

THE NETHERLANDS

PTT

Administration/operation:
Staatsbedrijf der Posterijen, Telegrafie en Telefonie
Centrale Directie
Kortenaerkade 12
P.O. Box 30000
2500GA The Hague Netherlands
Tel: 75 91 11
Telex: 31111 ptt nl

STANDARDS ORGANIZATIONS

GATT:

Dienst voor Economische Voorlichting en Exportbevordering
Afdeling Overheidsmaatregelen
Bezuidenboutseweg 151
2594 AG The Hague Netherlands
Tel: 79 89 11
Telex: 31099 ecoza nl

IEC, ISO:

Nederlands Normalisatie Instituut (NNI)
Kalfjeslaan, 2
2623 AA Delft Netherlands
Tel: 61 10 61
Telex: 38144 nni nl

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Exceptions:
Portable receivers for calling & paging: 12%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission & Reception
Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 18%

COMMERCE DESK OFFICER

Boyce Fitzpatrick
Country Specialist, Netherlands
ITA/U.S. Department of Commerce
Rm. 3415
Washington, D.C. 20230
(202) 377-3415

U.S. COMMERCIAL POSTS ABROAD

Stanley P. Harris
Commercial Section
American Embassy
Lange Voorhout 102
The Hague Netherlands
Tel: 62 49 11
Telex: 04431016
or
American Embassy
APO NY 09159

Mike R. Frisby
Commercial Section
U.S. Consulate
Museumplein 19
Amsterdam Netherlands
Tel: 79 03 21
Telex: 04416176 cgusa nl
or
U.S. Consulate
APO NY 09159

Commercial Section
U.S. Consulate
Vlasmarkt 1
Rotterdam Netherlands
Tel: 11 75 60
Telex: 04422388

or
U.S. Consulate
APO NY 09159

EMBASSY IN THE UNITED STATES

Embassy of the Netherlands
4200 Linnean Ave., NW
Washington, D.C. 20008
(202) 244-5300

CHAMBERS OF COMMERCE

Netherlands Chamber of Commerce in the U.S., Inc.
One Rockefeller Plaza, 11th Fl.
New York, NY 10020
(212) 265-6460

Peter J. Legro, Managing Director
Transavia Hollands
c/o American Chamber of Commerce in the Netherlands
Carnegieplein 5
2517 KJ The Hague Netherlands
Tel: 18 75 18
Telex: 18138
Fax: 15 14 24

J.J. van Steenbergen, General Manager
The American Chamber of Commerce in the Netherlands
Carnegieplein 5
2517 KJ The Hague Netherlands
Tel: 65 98 08/9
Telex: 31058 Amcoc nl
Fax: 64 69 92

PORTUGAL

PTT

Administration/operation:
Correios e Telecomunicacoes de Portugal (CTT)
Direccao Geral de Telecomunicacoes (DGT)
Edificio de Telecomunicacoes
79 Rua do Conde de Redondo

1192 Lisbon 1 Portugal
Tel: 57 40 33
Telex: 12520 gentlx p

Operation (domestic telephone):
Telefonos de Lisboa e Porto (TLP)
14 R. Andrade Corvo
1000 Lisbon 1
Portugal
Tel: 14 04
Telex: 13421 telefl p

Operation (international telephone):
Companhia Portuguesa Radio Marconi (CPRM)
15 Praca Marques de Pombal
1119 Lisbon Portugal
Tel: 53 41 91
Telex: 12384 cprm p

STANDARDS ORGANIZATIONS

ISO:

Comissao Electrotecnia Portuguesa
Rua Artiharia Um, 104-2 o E
1000 Lisbon Portugal
Tel: 68 10 48

IEC:

Direccao-Geral da Qualidade (DGQ)
Rua Jose Estevao, 83-A
1199 Lisbon Portugal
Tel: 53 98 91
Telex: 13042 qualit p

CUSTOMS DUTIES AND OTHER TAXES*

CUSTOM DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 13%
Radio Telegraphic/Telephonic Transmission & Reception Equip.: 3.9%
Exceptions:

Ports: 13%
Insulated Electric Wire, Cable, Bars and Strip: 13%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 13%

OTHER TAXES

VAT: 15%
Import surcharge: 10%

COMMERCE DESK OFFICER

Ann Coro
Country Specialist, Portugal
ITA/U.S. Department of Commerce
Rm. 3044
Washington, D.C. 20230
(202) 377-3945

U.S. COMMERCIAL POSTS ABROAD

Ralph D. Griffin, II
Commercial Section
American Embassy
Avenida das Forcas Armadas
1600 Lisbon Portugal
Tel: 72 56 00
Telex: 12528 amemb
or
American Embassy
APO NY 09678

U.S. Consulate
Apartado No. 88
Rua Julio Dinis 826-30adas
Oporto Portugal
Tel: 6 30 94/5/6

U.S. Department of State:
Commercial Section
U.S. Consulate
Avenida D. Henrique
Ponta Delgada Sao Miguel
Azores Portugal
Tel: 2 22 16/7

Telex: 82126 amcnpd p
or
U.S. Consulate
APO NY 09406

EMBASSY IN THE UNITED STATES

Embassy of Portugal
2125 Kalorama Rd., NW
Washington, D.C. 20008
(202) 328-3213

CHAMBERS OF COMMERCE

Portugal-American Chamber of Commerce
5 West 45th St.
New York, NY 10036
(212) 354-4627

Dr. Henrique M. Brito do Rio, General Secretary
American Chamber of Commerce in Portugal
Rua De D. Estefania, 155, 5 Esq.
1000 Lisbon Portugal
Tel: 57 25 61
57 82 08
Telex: 42356 amchm p

Robert R. Langelier
Director Gerente General
General Motors de Portugal
Av. Marcechal Gomes de Costa 33
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Tel: 85 39 96
Telex: 12599 autorex p

SPAIN

PTT

Administration:
Ministerio de Transportes, Turismo y Comunicaciones Junta Nacional
de Telecomunicaciones (Gabinete de Ordenacion de las Telecomunicaciones)
Calle de Alcala, 54

Madrid 14 Spain
Tel: 231-3300
Telex: 44100 jnt e

Operation (telephone):
Compania Telefonica Nacional de Espana (CTNE)
Gran Via, 28
Apartado 753
Madrid 13 Spain
Telex: 27320 ctne e

Operation (telex):
Ministerio de Transportes, Turismo y Comunicaciones
Direccion General de Correos y Telecomunicacione
Palacio de Comunicaciones
Madrid Spain
Tel: 221-4004
Telex: 27728 gentel e

STANDARDS ORGANIZATIONS

GATT:

Ministerio de Economia y Comercio
Subdireccion General de Politica Comercial Multilateral
Paseo de la Castellana No. 162
Madrid 16 Spain
Tel: 458-0016
Telex: 45082 polco e

IEC:

Commision Permanente Espanola de Electricidad
Francisco Gervas 3
Madrid 16 Spain
Tel: 458-0016
Telex: 45082 polco e

ISO:

Instituto Nacional de Reacionalizacion y Normalizacion (IRANOR)
Calle Zurbano 46
Madrid 10 Spain
Tel: 410-4961
Telex: 46545 unor e

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES

Telephonic/Telegraphic Apparatus: 9.4-13.6%
Radio Telegraphic/Telephonic Transmission & Reception Equip.: 19-24%
Insulated Electric Wire, Cable, Bars and Strip: 14.6%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 14.6%

OTHER TAXES

Compensatory import tax: 12%

COMMERCE DESK OFFICER

Christine Sloop
Country Specialist, Spain
ITA/U.S. Department of Commerce
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John D. Perkins
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Telex: 27763
or
American Embassy
Box 5
APO NY 09285

Kevin C. Brennan
Commercial Section
U.S. Consulate
Via Layetana 33
Barcelona Spain
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Telex: 52672

or
U.S. Consulate
Box 5
APO NY 09285

U.S. Department of State:
Commercial Section
U.S. Consulate
Paseo de las Delicias No. 7
Seville Spain
Tel: 23 18 85
Telex: 27780
or
U.S. Consulate
APO NY 09282

U.S. Department of State:
Commercial Section
U.S. Consulate
Av. del Ejercito
Deusto-Bilbao 12 Spain
Tel: 435-8308/9
Telex: 32589
or
U.S. Consulate
APO NY 09285

EMBASSY IN THE UNITED STATES

Embassy of Spain
2700 15th St., NW
Washington, D.C. 20009
(202) 265-0190/91

CHAMBERS OF COMMERCE

Spain-U.S.Chamber of Commerce
350 Fifth Ave.
Rm. 3514
New York, NY 10118
(212) 967-2170

Commercial Office of Spain
350 S. Figueroa St.

Rm. 946
Los Angeles, CA 90071
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Branch Office - Madrid

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Assistant Executive Director
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Hotel EuroBuilding
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Madrid 16 Spain
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UNITED KINGDOM

PTT

Administration:
Department of Industry
Posts and Telecommunication Department
Telecommunications Branch
Ashdown House
123, Victoria St.
London SW1E 6RB United Kingdom
Tel: 212-7676
Telex: 8813148 dihq g

Operation:

British Telecommunications (BT)
2-12 Gresham St.
London EC2V 7AG United Kingdom
Tel: 357-2548
Telex: 883051 bthq g

STANDARDS ORGANIZATIONS

GATT:

International Trade Policy Branch 5
Standards & Quality Assurance Policy Unit
Department of Trade
Millbank Tower
Millbank
London SW1P 4Q4 United Kingdom
Tel: 211-3460
Telex: 8811074 dthq

IEC, ISO:

British Standards Institution (BSI)
Central Enquiries Section
Park St. 2
London W1A 2BS
United Kingdom
Tel: 626-9000

CUSTOMS DUTIES AND OTHER TAXES

CUSTOMS DUTIES (as of 1988)

Telephonic/Telegraphic Apparatus: 7.5%
Exceptions:
Portable receivers for calling & paging: 12%
Modems: 4.6%
Radio Telegraphic/Telephonic Transmission & Reception
Equip.: 14%
Insulated Electric Wire, Cable, Bars and Strip: 6.5%
Fiber Optic Cable (Select Optical Appliances, Instruments and Lasers): 8%

OTHER TAXES

VAT: 15%

COMMERCE DESK OFFICER

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U.S. COMMERCIAL POSTS ABROAD

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Commercial Section
American Embassy
24/31 Grosvenor Sq.
W. lA lAE, London United Kingdom
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American Embassy
Box 40
FPO NY 09510

U.S. Department of State:
Commercial Section
U.S. Consulate
Queen's House
14 Queen St.
BT1 6EQ
Belfast Northern Ireland United Kingdom
Tel: 22 82 39
Telex: 747512

U.S. Department of State:
Commercial Section
U.S. Consulate
3 Regent Ter.
EH7 5BW
Edingburgh Scotland United Kingdom
Tel: 566-8315
Telex: 727303

EMBASSY IN THE UNITED STATES

Embassy of the United Kingdom
3100 Mass. Ave., NW
Washington, D.C. 20008
(202) 462-1340

CHAMBERS OF COMMERCE

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3150 California St.
San Francisco, CA 94115
(415) 567-6128

British-American Chamber of Commerce
275 Madison Ave.
Rm. 1714
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(212) 889-0680

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